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AUGUST 1978 #4

FUTURE

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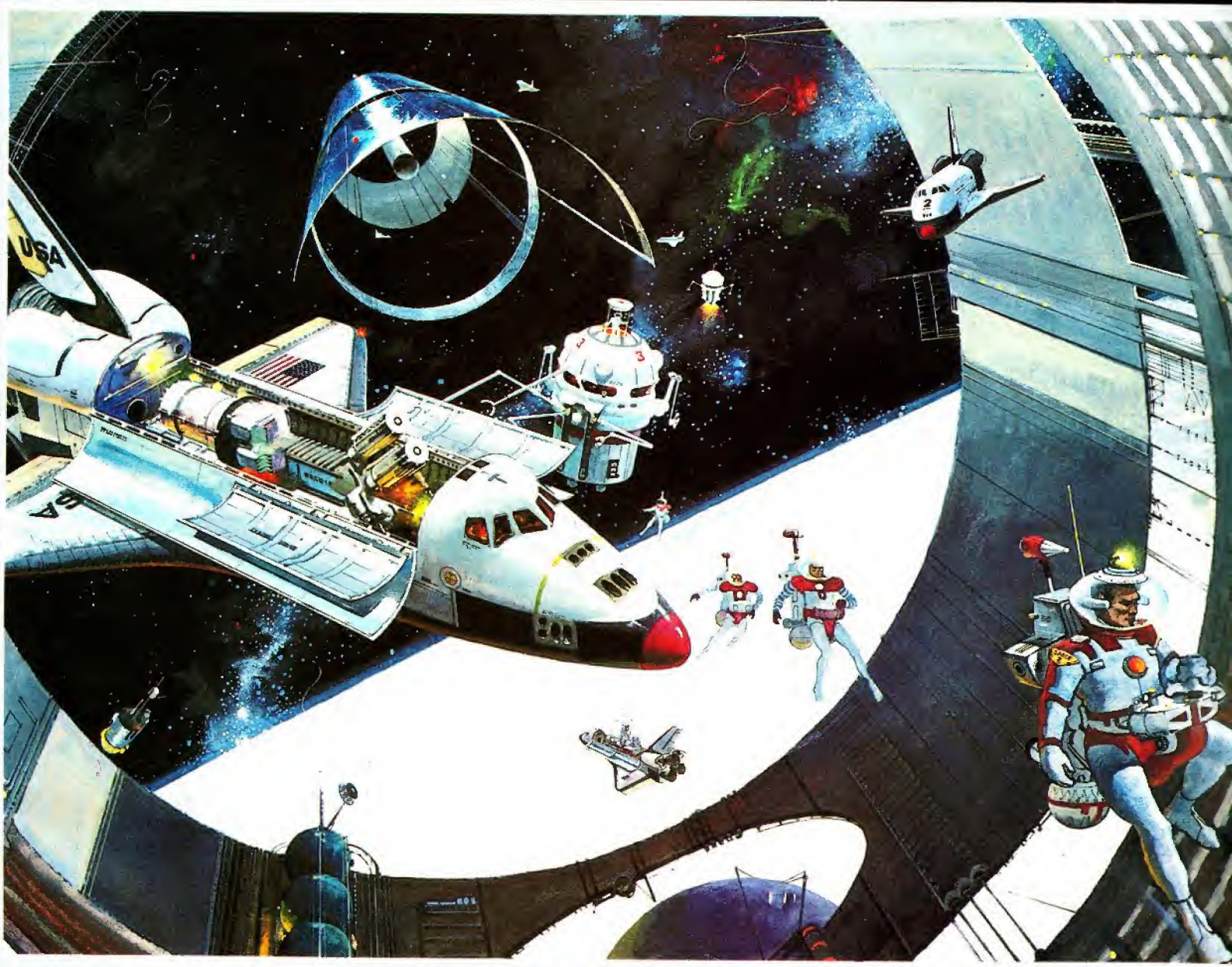

"Earth Orbit '98" from artist Bob McCall's portfolio of fantastic space art (pg. 66)

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Inside the L-5 Society • SF Pulps
ALVIN TOFFLER: Future Shock Today
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The "Logan" Man: WILLIAM F. NOLAN

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The Magazine of Science Adventure

FUTURE

AUGUST 1978 #4

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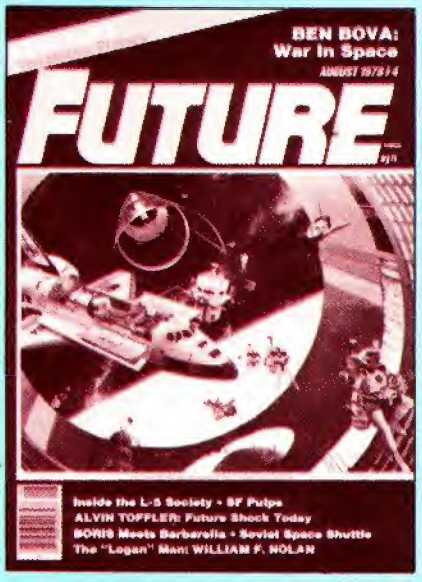

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On The Cover: Renowned space artist Bob McCall says his "Earth Orbit '98" is a prophetic painting, showing the initial construction phase of an O'Neill-type space habitat. The skin-tight spacesuits, compact rocket seats and other futuristic hardware are solid extrapolations based on current NASA research—just one of McCall's specialties. Some of his other favorite subjects such as SF movies and anti-gravity cities are pictured in the portfolio of his work which begins on page 66.

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output

When you read the interview article on Bob McCall, starting on page 66, you will discover that he is a man with years of artistic and scientific experience behind him. He has known many of the great space scientists of the world, worked with top moviemakers, and is invited to virtually all major NASA events. His career, you might think, has created a jaded, blase personality of reserved emotions and somewhat "dry" attitudes.

But as Bob McCall sat in our offices and showed us slides of his fantastic space art, his descriptions of why he loves everything he does sounded like the bubbling enthusiasm of someone 30 years younger. At one point, I had to

turn from the screen and look at the man talking to be certain that his son hadn't slipped into his seat in the dark. His voice was excited, awestruck and optimistic—like a kid.

Recently, I was talking with a wonderful woman who, for many years, worked closely with Dr. Wernher von Braun, and she described to me those historic meetings between von Braun and Walt Disney when they were collaborating on the space films described in FUTURE No. 2. Often working late into the night, the two men would brainstorm for hours, visualizing the steps by which Man would eventually reach into space, then to the Moon and on to Mars. It required men of genius to do what they were doing, but when they hit on a solution they really loved, these two giants would jump up and down and hug each other with complete abandonment of all dignity and decorum. They simply acted like thrilled kids.

At 90 years of age, Chesley Bonestell can still race me up the steps to his "treehouse" studio and behave like a schoolboy showing his guests his latest painting—hoping they will love it as much as he does. Music composer Albert Glasser (who is no spring chicken himself, but whose vigor is that of a teenager, attends science-fiction conventions with his walkie-talkies to keep in touch with his buddies in other locations. One has only to look at the latest films of George Lucas and Steven Spielberg to see that the spirit of youth which they both possess is alive and growing and blossoming into wonderful projects.

If you've ever had the pleasure of meeting George Pal or Gene Roddenberry or our own columnist Jesco Von Pettkamer, then you've come face-to-face with living proof that great creative minds can co-exist in the same person with the delightful sparkling spirit that most people, unfortunately, leave behind when they 'grow up.'

In fact, two of the most brilliant minds on our planet reveal their youthful souls with shameful frequency: Isaac Asimov, who knows more about everything than anybody, and has written books and articles on a thousand topics, publicly recites his sexy, dirty limericks—and is damn good at it! And Arthur C. Clarke, inventor, scientist, novelist—ended his latest letter to us just like the 8-year-olds who write to our office, with a little drawing of "IMPEACH DARTH VADER!"

When we look at all the intellectual and creative output these and other great humans have given us, when we appreciate all the ways in which they enrich our lives, let us not for a moment think that the work has been a social sacrifice on their part. You can be absolutely certain, whatever the struggles and pains involved, that they loved the whole process.

They have kept alive within them that spirit of youth that expects almost anything to be possible for them—and expects life to be barrels of fun. They are to be admired, not only for their cultural contributions, but also for their personal success in maintaining an untarnished attitude.

And they show us a very important lesson, in incontestable terms: inside every great person, there is a *kid* enjoying life to the limit!

Kerry O'Quinn/Publisher

input

Because of the large volume of mail we receive, personal replies are impossible. Comments, questions and suggestions are appreciated, however, and those of general interest may be selected for publication in future issues. Write:

FUTURE Input
475 Park Ave. South
8th floor suite
New York, NY 10016

ANNIVERSARY WISHES

. . .Let me wish STARLOG a happy second anniversary. Since it first appeared other magazines arrived, some with good stills but crummy articles. Some were copied from STARLOG with a low-quality carbon paper. But recently another new magazine appeared on the racks—a magazine totally different not only from those others but from STAR LOG as well. The articles are on different subjects; they are more concentrated on the roots of SF; the authors and artists. Still, FUTURE retains the quality of its older brother—intelligence and a concern for what the intelligent reader wants. Contrary to those other magazines, STARLOG and FUTURE are not based on the success of "Star Trek," "Star Wars" and "CE3K." I'd like to wish STARLOG and FUTURE a life so long that SF will become actuality . . .

Jean Guerin
228 Darwin #311
Nun's Island, PQ
Canada, H3E 1C6

MODERN MUSIC

. . . I appreciate the fact that you are showing how electronic progression and SF is affecting today's music ("Hardware" in FUTURE No. 1 and 2, "Databank" in No. 2) and that you are exposing some of these recordings in your magazine. Not many people are aware, however, of the amount of space-rock available or even of how space and progression affects music today. The synthesizer has been one of the most influ-

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ential electronic progressions to be applied to music today. With the synthesizer, one musician can create sounds as classical as Bach's *Brandenburg Concerto*—as did Walter Carlos on *Switched On Bach*—or music as futuristic as *The Intergalactic Touring Band*. Several other performers of space-rock include Klaatu, Hawkwind, Isao Tomita and Alan Parson, who also produced Pink Floyd's 200 week chart-runner *The Dark Side Of The Moon*.

John J. Hagedorn
Franklin Lakes, N.J.

Thanks for the kind words, John. If you're interested in space-rock, you might want to check out some of our sister magazine STARLOG's back issues. No. 12 featured log entry on both Alan Parsons and The Intergalactic Touring Band, *No. 11 log entries on Meco's* Star Wars, *P-Funk's saucer antics and Rush's* A Farewell To Kings, *and No. 10 offered an overview on the SF-Rock Connection. By the way, Alan Parsons didn't produce Pink Floyd, he was one of their engineers.*

UFO FLOP

. . . On the date of 3/15/78 I sent you a UFO photo and asked for an explanation. If you could not explain it look at this other photo. I FOOLED YOU!

Eddie Webb
Cupertino, Calif.

PS: Keep the photo as a souvenir.

Gee Eddie, you sure know how to disillusion . . . and we thought we had an exclusive.

HYNEK UFO FLAP

. . . May I congratulate you on your May, 1978 issue of FUTURE. Although I've read little if any science fiction and don't care for it personally, I do keep close tabs on worldwide UFO research, studies and investigations. Keep up your good work and let's get those young minds in our country on new scientific careers to further mankind's progress and not destruction.

George D. Fawcett
General Manager
Maiden Times Weekly Newspaper
Lincolntown, North Carolina

. . . I write in regards to your magazine's excellent perspective on the subject of UFOs. I commend you. Let me say that a year ago, I would have laughed at anyone who would have suggested that I'd be involved with UFOs in any measure. Once a die-hard skeptic, I am now a "wondering individual." Since November 12, 1977 I have seen a UFO here in the Charleston, South Carolina area on five different occasions, twice able to photograph it. Also, some of the sightings correspond with the dates of the mysterious air-quake vibrations which have rocked the East Coast, Texas Coast and Nova Scotia area. There have been roughly 26-50 Charlestonians and South Carolinans who have seen something in the area. Although *Close Encounters Of The Third Kind* was released, many of the sightings here in S.C. occurred before anyone had seen the movie.

Frankly, I wish people would quit trying to connect UFO sightings with *CE3K*. That was good escapism. What I photographed was . . . well, I don't know.

William James Herrmann
Charleston, S.C.

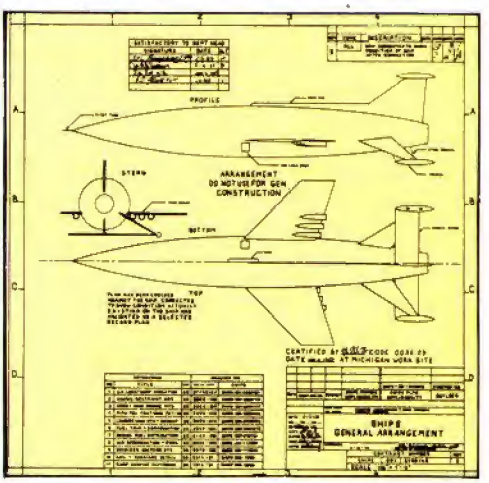
GRAPHICS GRIPE

. . . I noticed in your "SF Graphics" section in FUTURE No. 2 that the WABC radio ad seems to have borrowed its idea (making musical insruments into spaceships) from the album of the rock group, Boston. You'll notice on Boston's album cover that those spaceships are also guitars.

Which brings me to another point. Many record album covers (especially rock) use a science-fiction theme. Why not feature them in your "SF Graphics" pages?

Jerry Peterson
Pt. Clinton, Ohio 43452

Actually, Jerry, the concept of using rock and roll instruments in science-fiction terms is a visual idea that goes back to the fifties with a few singles and albums showing different instruments disguised as rockets and sputniks, etc.



MODEL READER

. . . The enclosed plan is a representation of Bonestell's space ark for George Pal's *When Worlds Collide*. The only information I had to go on were photos from various books, *Famous Monsters of Filmland* and STARLOG's book on spaceships. Since no Art Director's plans were used, there will be errors. The format of the plan is, as you can see, consistent with the plot of the movie. Names like Bronson, Fry and Stanton can be made out in the title and approval blocks. I am a semi-professional model builder and am building a model of the ark (without the ramp and track). Space permitting, I am asking you to publish this plan along with a call to interested model builders to come forth with their researches and projects. Keep up the good work and good luck with FUTURE.

David D. Merriman TM2 (SS/DV)
RA Division
USS YOSEMITY (AD-19)
C/O FPO NY, NY 09501

Apologia: In last issue's interview with Larry Niven a photo credit was inadvertently left out. The photo was taken by the very talented Richard Todd.

SOVIET SPACE SHUTTLE SPOTTED BY SPYSAT

Photo: Smithsonian Institution Traveling Exhibition Service

Descriptions of the mysterious Soviet space shuttle match up with this artist's concept of an advanced Russian spacecraft. Painted by Soviet artist Andrey Sokolov in 1973, "Space Liner" is part of an exhibition entitled Space Art from the U.S.S.R. (July 2-31 and August 20 to September 18, Louisiana Arts & Science Center, Baton Rouge; October 8 to November 6, Galley of Fine Arts, Topeka, Kansas)

Feeling smug about the technological superiority of the American space program as compared to Soviet space endeavors? If so, you can wipe that smirk off your face—because the latest news from the U.S.S.R. (courtesy military spy satellite) is that the Russians have their own version of a reusable space shuttle, a sleek delta-wing vehicle called Kosmolyot that is to NASA's space shuttle what a Ferrari Dino is to a Mack truck.

In a recent series of tests, a prototype Kosmolyot was dropped from a Tupolev Tu-95 bomber over a remote aeronautical testing facility, much the same as NASA's *Enterprise* was tested last summer in California. The Soviet spacecraft is said to resemble Boeing's Dyna-Soar, a now-extinct vehicle the Air Force wanted to establish space operations in the 1960s. Kosmolyot will doubtless perform some of the military tasks the Air Force had in mind for Dyna-Soar. For instance, the human eye sees more *intelligently* than any automated spy in the sky.

While NASA is on hold until its space shuttle is ready, the Soviets have had a lot of people in space recently (including the first non-citizen of the U.S. or U.S.S.R., a Czech scientist), and they say they intend to occupy near-Earth orbit continuously in the near future. Kosmolyot will serve as a space taxi, ferrying people and supplies to orbit. Soviet heavy-lift launch capability is well developed, relying on simple expendable boosters, and Kosmolyot will add an important dimension to their program. In addition, a suspiciously large satellite launched last summer—Cosmos 929—is believed to be testing some space tug and maneuvering devices that could be used to assemble large structures in orbit. Soviet researchers have emphasized perfecting a closed ecosystem for recycling air and water on a space station and experimented with growing food in zero-g.

The next Soviet "first" in space could well be the permanent population of near-Earth orbit. The new space race may be heating up again, but with nary a space station in the NASA budget, this race might be over by the time we're ready to start.

DIG WE MUST, FOR A GROWING TOMATO

Art: Ted Enik

An abandoned gold mine, deep in the heart of Alaska, may become the setting for an enormous hydroponic gardening venture that will allow the residents of Juneau to munch on homegrown cucumbers, onions, tomatoes and other vegetables in the near future. Tomatoes growing in Alaska, the great frozen North? Underground?

"It's something a person might imagine in a space colony," says Larry Chapin, spokesman for a local corporation called Alaska Hydro Gardens. "It's a closed environment. There would be long hallways and hard rock walls. Down the center set of tracks would be growing trays, with electric tractors that would pull them up and down."

The abandoned mine, located in The Last Chance Basin, has 26 levels, 15 of them below sea-level. In its active days (from 1886 through 1943) it produced over $80 million worth of gold. Retooling from gold to cucumbers might not be such an extravagant step. A hydro generator—to provide power for electric growing lights and heat—is already in place on a nearby creek.

The system would be completely closed between the farm and the generator, and nothing would leave the hydroponic farm that could not be handled by the larger ecosystem.

Hydroponics are likely to be an integral part of any space colony the future may bring. The most difficult aspect of growing edibles and comestibles without benefit of topsoil or sunlight is providing the relatively anaerobic soil with nutrients usually found in fertile growing areas. These fertilizers must be added in fairly intense doses, and may damage nearby water sources when they inevitably leach out of the soil. But The Last Chance Basin hydroponic farmers are confident they can assuage the fears of locals on this point. The way to keep nutrients down on the farm—once they've seen the lights of day—is to circulate them 15 floors below sea-level.

NASA TO CUE ASKEW CRAFT

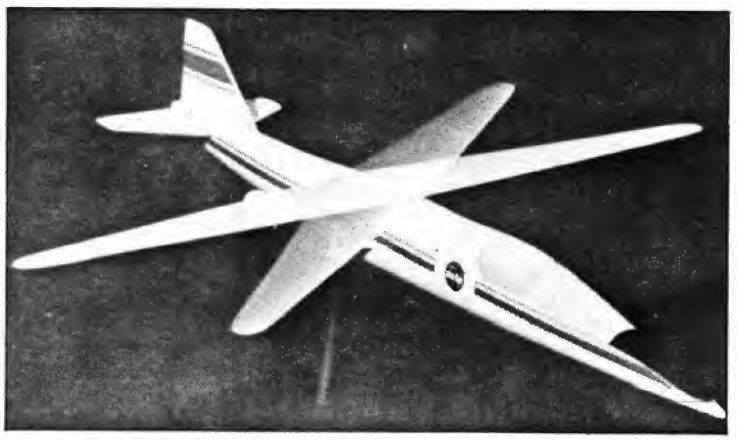


Photo: NASA

SST of the future? NASA model of new "oblique-wing" aircraft. On takeoff and at low speeds the wing is perpendicular to the fuselage—at high speeds it can be pivoted to a 60-degree angle to reduce drag and conserve fuel.

NASA's Dryden Flight Research Center has begun to develop, and fabricate, a design for a significant new aircraft—marking a radical departure in the design of high-speed planes. Called an "oblique-wing aircraft," what's new is the design of the wing. It swivels to what appears to be a whacked-out angle which, according to preliminary studies, may not be so cockeyed after all.

At lower flight speeds, the wing is oriented perpendicular to the fuselage, providing efficient and quiet takeoffs and landings, as well as excellent low-speed cruising capabilities. The engine thrust required for takeoff is substantially reduced, with quieter overall operations as the probable result.

But once the projected craft achieves a higher speed, the wing is pivoted fore and aft to form oblique angles of up to 60 degrees to the aircraft's fuselage. Studies indicate that this "scissors-wing" effect would make for better high-speed performance. Air drag would be diminished, providing longer range *and* increased speed for the same fuel expenditure used in traditional craft. This could mean twice the fuel economy of the current British-French *Concorde*, or the Russian SST. The sonic-boom problems of the current SST craft would also be alleviated somewhat—cheering news to SST opponents, who may have less of a leg to stand on in the future. The first flights of the new "oblique-wing" SST are scheduled for early 1979.

STARPAHC: SPACE AGE COMES TO VILLAGES

Deep space emergency surgery aboard long duration manned interplanetary flights . . . How will it be handled?

Current spacecraft design severely limits crew size, not to mention cabin space. Medical assignments will probably be handled by a single astronaut-physician or by a crew member trained as a physician's assistant. Health care and emergency treatment will have to be accomplished on-board the space craft as it makes its months or years-long journey to the outer planets.

In a space emergency demanding surgery beyond the immediate capabilities of the on-board astronaut physician, sophisticated communications equipment, backed by a computerized data processing system, would make it possible for a surgeon on Earth to "examine" the patient. He could study X-rays and other data telemetered to Earth, specify an inflight surgical procedure, and guide the astronaut-medic step by step through the operation.

Such a system is now being used on Earth to benefit people living in isolated areas—almost as remote as astronauts in space. This system enables a physician to help patients separated by great distances from his own physical location.

STARPAHC (Space Technology Applied to Rural Papago Health Care) is a joint program involving NASA's Johnson Space Center, the Indian Health Service of the Department of Health, Education and Welfare, and the Papago's Executive Health Council. Lockheed Missiles and Space Co. is NASA's support contractor.

STARPAHC's base of operations is the Indian Hospital at Sells, some 70 miles from Tucson. The project serves some 75 villages scattered throughout some 4,300 square miles of the Sonora Desert. Distance is only part of the travel problem for the almost 10,000 inhabitants, as many roads are unpaved and hazardous over the alternately flat and mountainous terrain.

The Mobile Health Unit, a large van containing diagnostic and communications equipment, is the traveling link to the STARPAHC base of operations, the Indian Hospital at Sells. The van is staffed with a Community Health Medic (CHM) and a laboratory technician. It travels from village to village on the reservation on a regular schedule handling as many as 27 patients daily.

The van has two main sections. In the reception room the CHM interviews the patient; if necessary the CHM can call up the patient's medical history on a computer terminal from data stored in Albuquerque. In the examining room the CHM examines the patient under the supervision of a physician at Sells, who watches on TV and converses via radio link. A color TV camera can be manipulated by the CHM to give the physician in Sells close-up pictures of any part of the patient's body. The van's laboratory can handle a variety of tests and radio the results to the doctor at Sells or even transmit views of microscope slides via TV. The clinic can also transmit X-ray pictures.

STARPAHC also includes a fixed clinic at Santa Rosa, another town on the reservation perimeter, and a link with the Indian Health Hospital in Phoenix for consultation with medical specialists when a special problem arises.

The telecommunications network which links the system is in principle the same sort of network that would be necessary to handle deep space medical emergencies. At the top of Quijotoa Mt. near the center of the reservation, a microwave station relays the TV and data signals between STARPAHC's various units. With the success of STARPAHC on Earth, NASA derives a double benefit: proper health care of its men in the far reaches of space as well as the far reaches on Earth.

Photos: NASA

Above: A key feature of STARPAHC is the Mobile Health Unit, a medical facility on wheels. STARPAHC employs space data processing technology to provide remotely directed health care for the Papagos. Left: A major element of the network is the microwave station on Quijotoa Mountain, near the center of the Papago reservation. The station relays TV, voice and medical data from Sells to the mobile unit.

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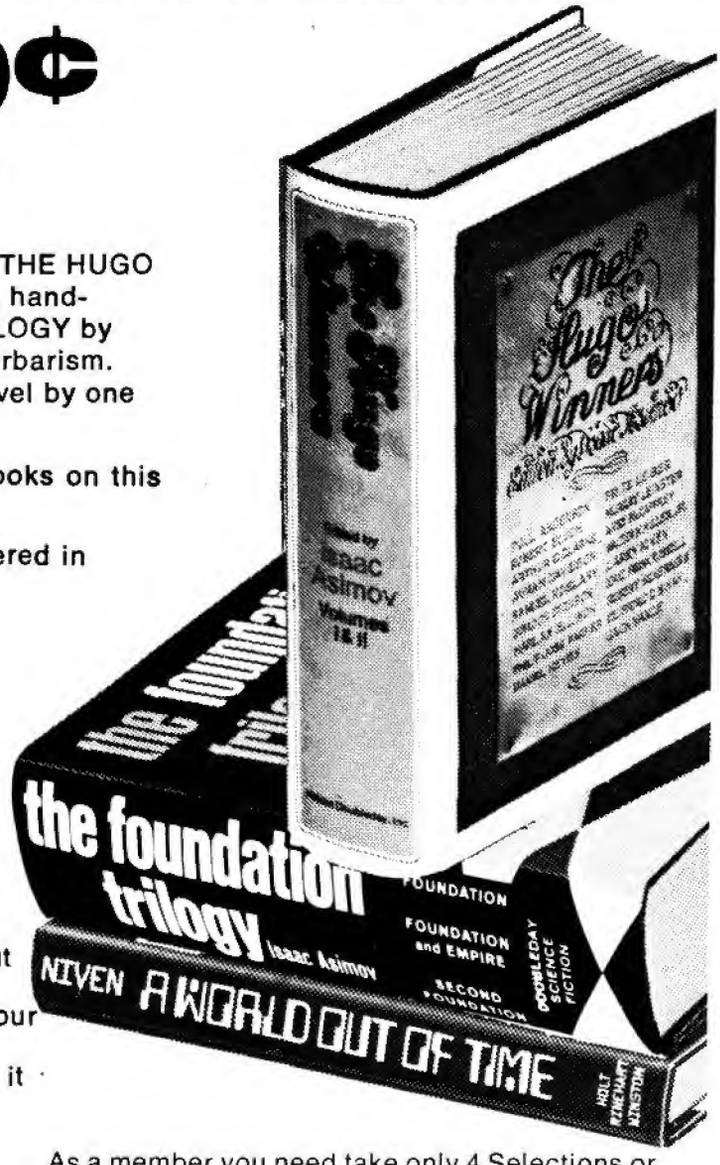

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NEW ASTRONAUTS TO BEGIN TRAINING

Beginning July 1, 35 new astronaut candidates will begin training at Johnson Space Center in Houston, joining the astronauts already on flight status. The new group, who are likely to see duty on NASA's space shuttle flights, includes six women and four minority members. The true minority, however, is one called "civilian"; 21 out of the 35 new candidates come from the military.

How does a person get selected to become an astronaut? The process is long and arduous, with long odds against any individual application. For the 35 positions open, NASA received 8,079 applications during a year-long recruiting period that ended in June of 1977. From this initial batch, 208 men and women were asked to come to Houston for interviews and medical examinations; 56 were found to be medically unqualified and were eliminated.

Three more candidates decided that they were no longer interested in becoming astronauts, leaving a final group of 149 men and women from which NASA eventually chose their 35.

After two years of training and evaluation in Houston, the group will become qualified astronauts, and enter the shuttle training program leading to selection on a space shuttle training crew.

There are two sub-divisions among the 35 people chosen; pilots and mission specialists. Those selected to be pilots will operate the space shuttle orbiter, maneuvering it in Earth orbit and flying it back to Earth for a runway landing.

Mission specialists will have overall responsibility for the coordination, with a commander and a pilot, of all shuttle activities in the areas of crew activities, food and energy usage, along with experimental operations that will be carried out onboard the shuttle. They may take walks in space (extravehicular activity) to perform maintenance operations, using the space shuttle remote manipulator system. Or they may just assist in other day-to-day activities.

There are currently 27 astronauts on active status; the addition of the new group means that within two years, that number could increase to 62.

Photo: NASA

MARTIN: MAN OR MONSTER?

Teenaged Martin has problems. Like most boys his age, he devotes a great deal of time to his hobbies. Unfortunately, Martin's extracurricular activities these days consist chiefly of stalking, assaulting and killing young women before slitting their wrists and drinking their blood. To make matters even worse, Martin's Uncle believes the boy to be an 84-year-old vampire; his cousin thinks he's not too tightly wrapped and his alcoholic mistress tells him he's cute.

Martin is the latest cinematic creation of George Romero, the filmmaker who

(continued on page 12)


Photo: Libra Films

John Amplas displays rather unique dietary habits in *Martin*, a new film by George (*Night Of The Living Dead*) Romero. Says Romero of his new on-again, off-again vampire creation: "Martin is a vampire in that he drinks blood . . . but to categorize him as such is to not only misunderstand him, but to forgive him in a way." Uh-huh.

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unleashed *Night Of The Living Dead* a few years back and is now preparing the sequel, *Dawn Of The Dead*. Shot near Pittsburgh on a six-day-a week, ten-hour-a-day schedule for six weeks, *Martin* is a disturbing look at bloodletting starring newcomer John Amplas. John describes his ravenous role as being "largely physical . . . even close to mime."

Romero helped John in his day-to-day gorefest in a fairly subtle way. "There is limited dialogue in the film," John says. "For my part, George's direction took the form of walking me through the action and leaving the projections of Martin's personality to me." Despite the gruesome goings-on on screen, John insists that the movie was fun to make. "George has a terrific sense of humor," he stresses. "It's seen all through the film, especially in the bloodiest scenes. He's a real charmer at that."

Although the film never quite reveals whether Martin is a carnivorous creature or a cretinous crazy, John tends to side with the traditional viewpoint. "Personally, I feel he was a vampire," he states, disagreeing with Romero who describes *Martin* farily ambiguously. "We can believe that Martin is cursed," Romero explains, "or we can believe that he is simply mad. His dreams of torch-bearing mobs and fog-shrouded mansions may be called up from films he has seen. *We've* seen them too."

Now that his blood-drinking days are behind him and *Martin* is making its way to theaters across the country, John is turning to new projects with producer-director Romero. At present, he is Zombie Casting Director for George's forthcoming *Dawn Of The Dead* SF horror thriller. And, if movie buffs find *Night Of The Living Dead* and *Martin* stomach churning, John happily assures the public that they ain't seen nothin' yet. *"Dawn Of The Dead* will be a highly *colorful* film," he smiles cryptically.

NUTS AND BOLTS OF KRAFTWERK

Photo: Capitol Records

Schneider and Hutter are two musicians who do not consider themselves rock stars despite Kraftwerk's hits. "We are acoustic scientists," they explain to an understanding friend.

We consider ourselves not so much entertainers as scientists," says Kraftwerk's Ralph Hutter. "We generate electrical energy."

In Germany, the word "kraftwerk" means "electrical power plant," but to music lovers throughout the world, the term also means music . . . spacey music. Kraftwerk is a German quartet, helmed by poker-faced Florian Schneider and Ralf Hutter, who create music out of machines. Hooking up ordinary synthesizers with cannibalized computer parts, Florian and Ralf, together with Karl Bartos and Wolfgang Flur produce a sound that is totally *unreal*. Their synthesized strains have won them acclaim in the past via such bizarre hit singles as "Autobahn" (1975) and "Trans Metal Express" (1977), and now the foursome have released an album that promises to be even further out than any of their previous endeavors.

Entitled *Man-Machine*, the LP sums up Kraftwerk's feelings on life in general. "We call ourselves the *mensch-machine,*" Ralf reveals, "the man-machine, since we are not musicians in the traditional sense. We are acoustic scientists. In our laboratory, we set up sound machinery and connect ourselves to it so we have a personal relationship with it.

"Sometimes we play the machines, sometimes they play us. It's totally symbiotic. The idea of the scientist or mad scientist discovering something that is *true* in his laboratory is similar to the way we work. We work in our studio/laboratories until we find something. When we do, we put it on tape. It is captured. We then present it to our audiences."

On their new LP, the four scientists conjure up such symbiotic songs as "The Robots," "Spacelab," "Metropolis," "The Model," "Neon Lights" and "The Man-Machine." A key to Kraftwerk's musical philosophy can be found in the robot tune wherein several band members croon "WE are the robots."

"We ARE the robots," Hutter admits. "We no longer have a relationship of dominating and exploiting our machines for profit. We try to cooperate with them. And the machines, I think, show a certain cooperation with us."

To prove their point, Ralf and Florian recently unveiled their new release in New York by staging an "in-concert" performance of their long player featuring four mechanical musicians . . . exact doubles of Kraftwerk's human members. Hutter wishes that music critics would accept their scientific approach to melody and avoid traditional labels when describing the band's robotic rhythms. "We are beyond music," he stresses. "We deal with *sound*. To explain anything further would take much, much time." But Ralf will explain in the next issue of FUTURE magazine, where the *mensch-machine* antics of Kraftwerk will be explored in an exclusive interview with both Ralf and Florian . . . two of rock and roll's most notable robots.

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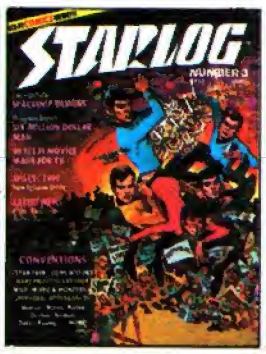

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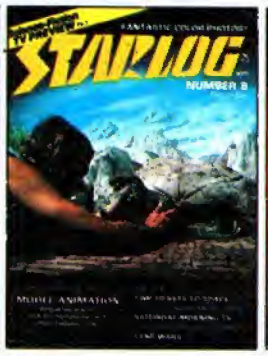

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NASA PUSHING SPACE RETRIEVAL SYSTEM

By the end of 1979 (Congress willing) NASA will have a versatile new piece of hardware called a Teleoperator Retrieval System (TRS). It will come in handy when the space agency gets around to doing something with Skylab—either boosting it to a higher orbit or controlling its imminent descent to Earth. In either case, Skylab must be outfitted with a propulsion system of some sort. So NASA wants a TRS.

"Teleoperated" means the semi-robotic propulsion system would be controlled by a crew member on the space shuttle, using TV monitors, special hand controls and telemetry displays. Martin-Marietta's TRS design is a compact box-like core (4' by 4' by 5') which houses guidance, navigation and control systems, a communications and computer system and a propellant tank. Two TV cameras and a docking system are mounted on the front, and hot-gas rockets are stapped to the sides of the core.

The space shuttle will park in orbit near Skylab and TRS will self-eject from the cargo bay, then rendezvous and dock with Skylab. Depending on how much the 10-ton derelict is tumbling, that could be a tricky operation.

Whatever direction TRS sends Skylab, once on its way TRS will detach and park in orbit to be picked up by a later shuttle flight. (NASA knows better than to dump $35 million into the ocean.) This neat little gadget can be put to lots of other uses, like maneuvering elements in space for assembly of large structures; add-on components can increase its capabilities.

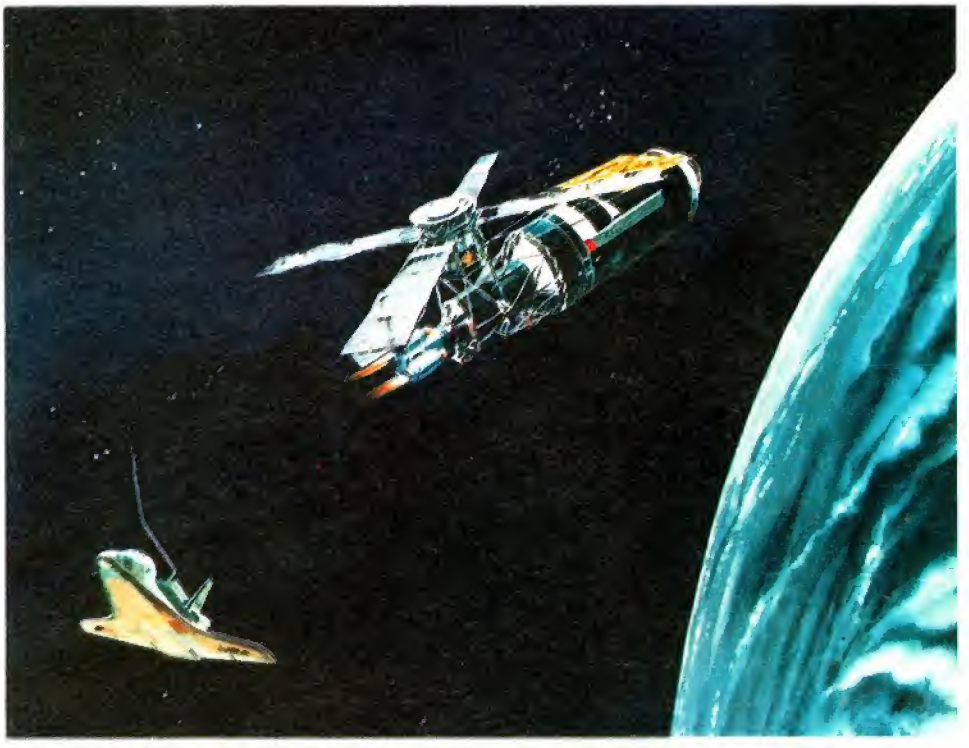

Photo: NASA

NASA's solution to the Skylab problem: a semi-robotic rocket booster will hook up with the derelict space station to either push it into higher orbit or control re-entry. Robot rocket parks in orbit and waits for another call to action.

The "R" in TRS stands for retrieval. NASA says TRS can be used in the future to retrieve objects from higher orbits than the shuttle can attain and to pick up "unstable objects and space debris." NASA doesn't say what it plans to do with the latter, but so far there's been no press release on space baggies for the shuttle cargo bay.

Photo: NBC

Quark's Bettys: The Joys of Cloning

LAUGH, CLONE, LAUGH

What happened when Baskin and Robbins combined? They became ice cream clones." The preceding joke was brought to you by the March 20, 1978, issue of *Newsweek* magazine. Knowing a good thing when they see it, *Newsweek* duplicated their feat with the following: "Then there's the singing group, Clony Orlando and Dawn, Dawn, Dawn." Soon after, syndicated newspaper humorists Russell Baker and Art Buchwald got into the act with columns like, "So You're Thinking of Cloning," and "Keep Your Clones to Yourself."

All the fuss is due to one David Rorvik, a science writer who claims that cloning is not only possible but already achieved. According to his hardcover bestseller—*In His Image: The Cloning Of A Man*—an American millionaire has genetically duplicated himself using one cell of his body. Even before the book was published in early April by J.B. Lippincott, controversy raged in both the scientific community and tabloid headlines. Under the newspaper title "BABY BORN WITHOUT A MOTHER," one doctor was quoted as saying, "It's worse than Hitler a thousand times. It's horrible!"

Speaking of Hitler, novelist/playwright Ira Levin (*Rosemary's Baby, Deathtrap*) had the same idea and wrote *The Boys From Brazil* several years before the recent furor began. The novel, which has since been made into a well timed movie starring Gregory Peck and Laurence Olivier, tells of a Nazi war criminal's master plan to recreate Hitler 94 times over using a scraping of the dictator's skin.

Up until the present, however, cloning has not been a classic science-fiction concept. Compared to the Bug Eyed Monsters or *Star Wars'* space staples, "mononuclear reproduction," as it is technically called, is unexplored ground. Therefore it is not surprising that entertainment entrepreneurs are making quick work of it. Rorvik's book—already in its third printing and translated into five languages—has joined the likes of the *Quark* clone-twins, The Tubes' musical group's tome *Cathy's Clone*, and the proposed TV series *The Clonemaster*.

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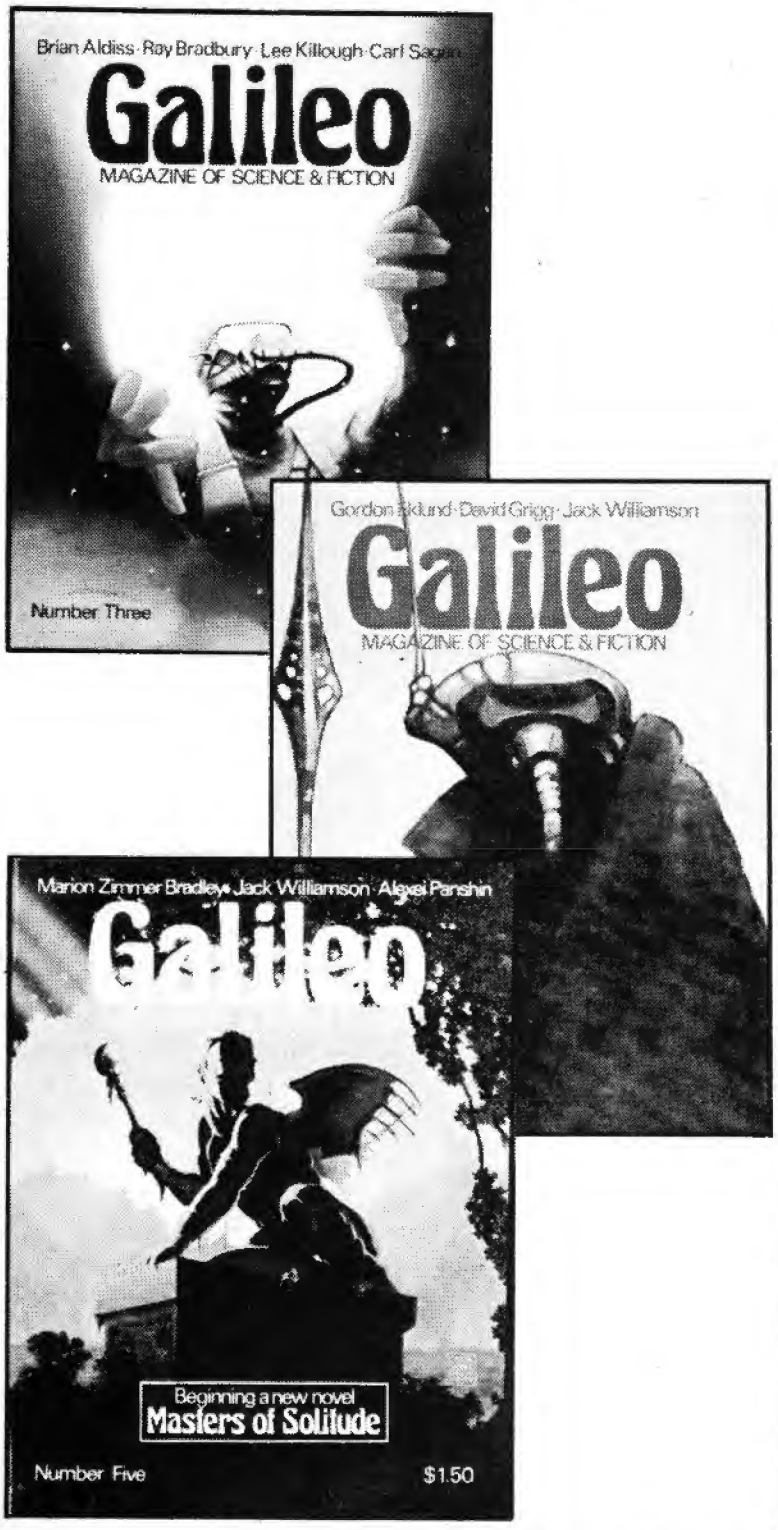

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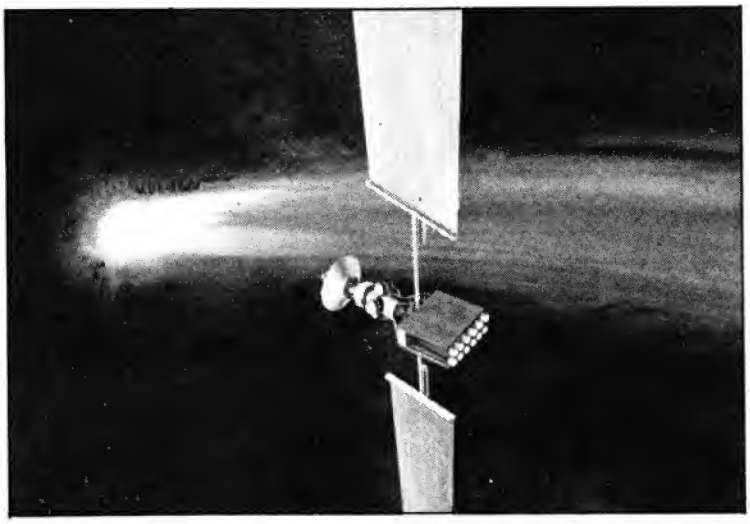

NASA artist's concept of ion drive spacecraft maneuvering in for a close view of Halley's Comet. Considerations of time and money will force comet scientists to make do with a less spectacular mission than first proposed.

Comet scientists are collectively sighing about what might have been. Only a few months ago they were excitedly anticipating a rendezvous with Halley's Comet (STARLOG No. 8), a close-up inspection of the most impressive comet in our solar system. Now the rendezvous has been called off. The decision came from NASA Headquarters, where it was decided that it would be too risky and too costly to have a spacecraft ready in time for the 1982 launch date required. The main obstacle: developing a low-thrust ion drive engine in time. Ion propulsion (a fuel-efficient drive in which propellant gas is bombarded with electrons, releasing a stream of ions to provide thrust) apparently works—there are ion thrusters functioning in vacuum chambers at NASA's Lewis Research Center right now. But to actually build and launch an ion drive spacecraft by 1982 would require lots of extra time and money devoted to the project, beginning next year. Unfortunately, NASA only has so much money and too many pressing priorities. The space agency therefore decided not to ask Congress to fund a Halley's Comet rendezvous. There is still a possibility of a close encounter with Halley's, a "ballistic pass" or fly-by on the way to another comet a few years later, once the ion drive is ready.

But the difference between a ballistic pass and a rendezvous is a substantial one. In the original scenario for the rendezvous, a spacecraft would be launched in 1982 and head out to meet Halley's. A highly maneuverable ion drive spacecraft could match orbits with the comet and tag along for a few months, observing as it approaches the Sun, probing the luminous icy planetoid that is the 'head,' sniffing out new information and taking pictures for transmission back to Earth. It might have been one of the most dramatic scientific episodes of the century. But it won't happen this century.

What is more likely to happen will be something like this: About 1985 a spacecraft will be launched to rendezvous with one of two smaller comets, either Temple 2 or Encke (pronounced "inky"). Both are minor, short-period and fairly boring comets. Temple 2 circles the Sun every 5.3 years. Encke is the shortest-period comet known (3.3 years), so small, dim and unspectacular that it never even develops a tail. But a rendezvous will nevertheless provide valuable information about those mysterious members of our solar system. On the way, the spacecraft may attempt a ballistic pass of Halley's, a close fly-by at a speed of about 50 kilometers per second. It will be a quickie—but better than the view from Earth, which promises to be unspectacular this time around. Halley's Comet last visited in 1910, a dramatic encounter in which our planet actually passed through the comet's diaphanous tail. But this time we'll be in the wrong part of the solar system for a good show, and—as is the fate of all comets—Halley's is wearing down with each pass by the Sun, so it will be somewhat dimmer when it arrives in 1986. Still, Halley's is the most spectacular comet in our solar system, 100 times bigger and brighter than Encke or Temple 2—and it won't be back for another 75 years (2062). Comet scientist Laurel Wilkining, a member of the NASA study group which recommended the Halley's rendezvous, admits she and her colleagues are disappointed. About the difference between Halley's Comet and the likes of Encke and Temple 2 she says, "It's like a respectable bomb compared to a firecracker."

MANDALA

In a world where many good ideas die aborning, Mandala has built the better mousetrap. Their unique American publishing concept—the Fotonovel—has been riding a wave of high sales and affirmative reviews since its appearance in November, 1977. Since then Bantam has released more than a half-dozen *Star Trek* Fotonovels and Mandala has extended its influences into newspaper pages with the *Star Trek* comic strip (see FUTURE No. 1 and STARLOG No. 15).

The corporation and its president, Lazlo Papas, have more on their hands than the Starship Enterprise, however. Recently they packaged and delivered the mothership to Dell Books between the handsome covers of the *Close Encounters Of The Third Kind* Fotonovel. At $2.50, the volume captures Steven Spielberg's stunning movie in over 400 color shots from the film, adding a depth the novelization couldn't, showing the characters' thoughts through comic-like word balloons. It makes for an interesting work for cinema students and a must-have for CE3K lovers.

Papas and company haven't stopped there, however. "*Close Encounters* will be our last licensed work for another company." he proclaimed. "From now on Mandala will be a publishing house." The first effort under the new imprint will be a Fotonovelization of the movie musical *Grease,* but Papas hasn't forgotten the roots of their North American success. "Science-fiction is still the best subject matter for us," he contends.

To prove it, Mandala has plans for at least one more major SF movie adaptation before the year is out, fotonovelizations of *all* the James Bond/007 films, and an original superhero work. The latter endeavor involves the hiring of actors and the creation of an all new script to be enacted for the Mandala cameras. If the project lives up to Papas' expectations, it may become the first Fotonovel adapted *to* the screen, rather than from it.

This sort of prolific output and quality conceptions is just par for the Mandala course. "We are science fiction fans," Papas declared. "And we'll spare no effort bringing to the public more SF Fotonovels . . . for our common friends."

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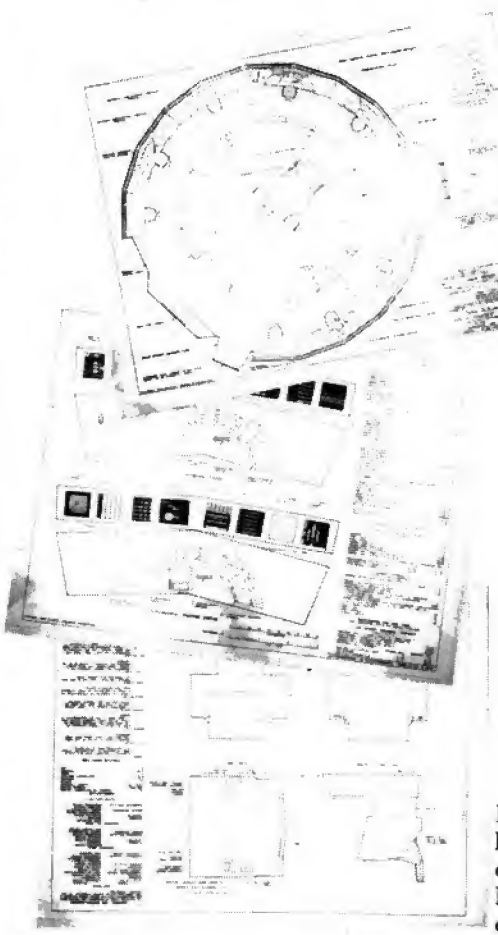

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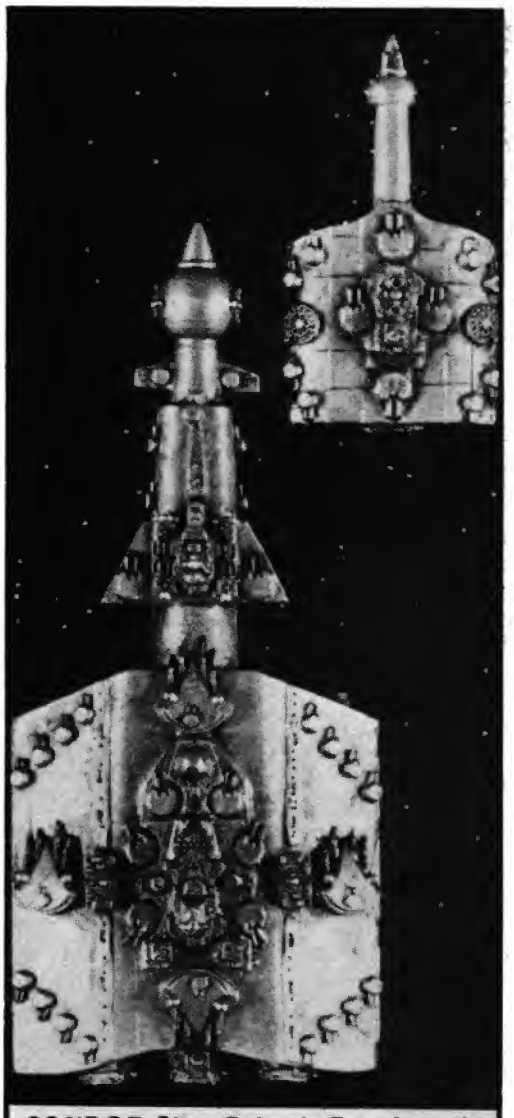

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NOISE And Meaning IN SF Films

A noted science-fiction author assesses the current crop of SF films.

By URSULA K. LeGUIN

A dark screen. The title, *Close Encounters,* appears in silence. The sound begins very, very softly; rises slowly; explodes into a roaring fortissimo—and stays there during the rest of the movie.

The light is often at top brightness, too, but it is almost impossible to make the light from the projector painful; and anyhow, we have eyelids. But no earlids. The light is used with variety and a great deal of beauty. The sound is used with brutality.

Very seldom can one understand a complete sentence. Words are mumbled and slurred off, method-style, shouted or screamed into dust-storms, windstorms, helicopter backwash, yelled simultaneously in French and English, redoubled and self-effaced by loudspeaker echo. A few lines come through clear, and they are effective:

"I *didn't* want *to see it.*"

"Yes, I saw you running up in the air, did you see me running after you?"

And my favorite, whispered:

"Mince alors . . ."

Just enough comes through to convince the middle-aged moviegoer in the fourth row extreme left (does Pauline Kael ever have to sit in the fourth row extreme left?) that she isn't going deaf, and that the unintelligibility is deliberate. Perhaps it is used to disguise the banality of most of the dialogue. Certainly there were moments in *Star Wars* when one prayed in vein for unintelligibility . . . Possibly the high proportion of noise to meaning *has* a meaning. But I am afraid that it serves merely to augment the hysterical tension established in the opening scene and never relaxed thereafter.

Why, after all, does there have to be a dust-storm in the Sonora Desert just then? Why does everyone rush about screaming in three languages? The discovery of mysteriously just-abandoned World War Two planes might very well take place quietly, eerily; deserts aren't noisy, crowded places, as a rule. But no. The wind and all the performers have to howl in unison.

When humans and aliens finally communicate, it is by musical tones. In that one scene the noise-gimmickry all comes together; it is at last a genuine climax. If it rose to true music, it would be a great moment.

But even then it would not justify the rest of the soundtrack, which uses noise to whip up emotion, the same trick that's so easy to do with electronically amplified instruments: decibellicosity. Exposed to aggression by loud noise, the body must continually resist its own fight/flight reaction, thus building up an adrenalin high, thus feeling surges of unfocused emotion, increased pulse-rate, etc.—thrills and chills. No harm. Same as a rollercoaster. But a rollercoaster doesn't pretend to have a message. On the other hand . . . *Star Wars,* which rather ostentatiously pretends not to have any message, may be even trickier.

The end of *Star Wars* kept bothering me after I saw it the first time. I kept thinking, such a funny silly beautiful movie, why did Mr. Lucas stick on the wooden ending, a high-school graduation, with prizes for Good Citizenship? But when I saw it again I realized it wasn't high-school but West Point: a place crawling with boots and salutes. Aren't there any civilians in this Empire? Finally a friend who knows films explained to me that the scene is a nostalgic evocation or imitation of Leni Reifenstahl's famous film of the 1938 Olympics, the German winners receiving a grateful ovation from the Thousand Year Reich. Having dragged Dorothy and Toto and that lot around the cosmos a bit, Mr. Lucas cast about for another surefire golden oldie, and came up with Adolph Hitler.

Anyhow, what the hell is nostalgia doing in a science-fiction film? With the whole universe and all the future to play in, Mr. Lucas took his marvelous toys and crawled under the fringed cloth on the parlor table, back into a nice safe hideyhole, along with Flash Gordon and the Cowardly Lion and Luke Skywalker and the Flying Aces and the Hitler Jugend. If there's a message there, I don't think I want to hear it.

There are gorgeous moments in *Star Wars*, especially on the desert planet (before everybody gets into uniform). The little desert people, the caravan, the behemoth, the town, R2D2 lost, and so on. Through the impasto of self-indulgence and the comic-book compulsion to move-move-move, there breaks a childlike, radical, precise gesture of the imagination: and you glimpse what a science-fiction movie might be like, when they get around to making one.

Close Encounters has science-fiction elements—the space ship is even more splendid than the one in *Star Wars*—but it seems to me essentially an occultist movie. It's much more amiable than the endless nasties about little girls possessed by devils; it's definitely on the side of the angels. But the arrival of benevolent aliens in saucers is a theme science fiction hasn't dealt with, except facetiously, for at least a generation. Fiction writers got out long ago, leaving the field to believers, faddists, amateur photographers, psychologists, and the Air Force. Saucerism has a lot to do with religion, as Jung pointed out, but nothing at all to do with either science or science fiction.

Indeed the movie seemed almost entirely irrational. Perhaps, being middle-aged and seeing it from a highly oblique angle, I missed some explanations. I ought to see it again before saying this: but my impression is that the plot abounds in giant loopholes, as the universe abounds in black holes, or does it? How does the U.S. Government know *when* to expect the aliens? Why do they have a troop of—well, exchange students, I guess—all dressed up in red pantsuits (one woman, or was it two? in the whole troop) ready to go aboard the saucer? How do they know they'll be wanted? What the dickens is Francois Truffaut doing there? And if he's there, admidst all the security officers and dead sheep, why aren't there any Mexicans or Chinese or Russians or Canadians or Peruvians or Samoans or Swahili or Thai? Why does the United States get to hog the cosmic show? Why does—Oh well. Shoot.

"Why do you spoil it, asking questions?" everybody snarls at me.

Well, because both movies come on

(Continued on page 74)

This article first appeared in *Parabola Magazine*, Volume III, Number 1.

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An Interview With *The Logan Man*

Photo: MGM

WILLIAM F. NOLAN

Photo: courtesy William F. Nolan

Every fiction writer has a secret dream—to invent the ultimate hero. Edgar Rice Burroughs did it with Tarzan, Arthur Conan Doyle did it with Sherlock Holmes, and William F. Nolan has done it with Logan.

By DAVID HOUSTON

Science-fiction enthusiasts who know William F. Nolan only as author of the Logan novels (*Logan's Run, Logan's World* and, upcoming, *Logan's Search*) don't *really* know William F. Nolan. His most famous creation, Logan, is merely the tip of the Nolan iceberg; there's a *lot* more underneath!

"But I sure don't mind when fans and readers identify me as 'the Logan man'," says Nolan. Every writer wants to conjure up at least one mythic character in the course of his career. There's a special joy in myth-making, in creating characters like Tarzan, James Bond, Dr. Kildare—heroes who touch the youth, rebellion—and escape. With Logan, we run from death; we *survive*."

Before Logan made him one of the highest-paid writers in science fiction (perhaps *the* highest paid), Nolan had turned out over 600 pieces of work embracing almost every genre of writing.

He sold reviews, critical essays, verse, short stories, articles, satire, reports, checklists, profiles, TV and film scripts and novels. "I've even done stuff for *Mickey Mouse Comics*. You name it, I've written it!"

All this has kept him alive and reasonably comfortable since 1956, when he turned to writing full time.

Nolan and I had a long, pleasant lunch at one of his favorite Hollywood haunts—and discussed everything from how much he earns as a writer to Logan's conceptual birth and TV demise at the hands of CBS. Nolan seems to be totally unguarded, and says what he thinks and to hell with the consequences; he is apparently made up of equal portions of humility and egomania.

He speaks of ego: "You need to have it, *lots* of it. Unless you possess a deeply-rooted belief in yourself, in *your* talent, writing can destroy you. It's a hard business—particularly in the film industry, where a writer's work is subject to continual revision, from original concept to final shooting draft. I write books to keep sane—but I can't say I don't enjoy the equal challenge of script writing. For the most part, I get along fine with producers and directors; we

"I've come up with an exciting concept for a third Logan novel—as Logan hunts his second self in another Universe."

respect one another. That's the key to it.

"I consider myself a major talent—and that's backed up by my yearly income. It's now into six figures. Over one 70-day period in '77, I earned $70,000 in exactly 70 days; fifty from Bantam as an advance on *Logan's World*—which I finished in 50 days—and the other twenty thousand from ABC for a TV pilot I wrote in just under three weeks. Already, in '78, I've signed a six-figure film deal with Universal. It adds up."

This highly successful writer—who did not sell a really major work until he was 37 ("although I was writing by the age of 9!")—has every right to be inordinately proud of his accomplishments and excited about his future. SF fans should be excited about his future, too, as reflected by Nolan's current projects:

- **Screenplay**: for Universal's new version of *The Thing*, now in development. "We are going back to the original story by John W. Campbell, Jr. and hope to use his title, *Who Goes There*? as the title of our film. It will not, in any sense, be a rehash of the Howard Hawks version. Universal hopes to make it their major SF/terror film for 1979."
- **Screenplay**: on *Logan's World*, for producer Saul David. "It will be financed, and filmed, in Europe—and we plan to re-team Michael York and Jenny Agutter as Logan and Jessica. But it's a long-range project, and we won't be into it for a while."
- **Novel**: *Logan's Search,* as a new Bantam paperback. "I've come up with an exciting concept for a third Logan novel—as Logan hunts his second self in another Universe. Hope to have the book finished in '78 and published sometime next year."
- **Screenplay**: on his 1971 novel, *Space for Hire*. "The book has been optioned by a sharp two-man team of young producers who've worked on *2001* and *Close Encounters*. They are high on the idea of doing it as a 'far out' SF adventure/satire full of wild special effects: Bogart on Mars! Pure fun all the way."

In addition to all of these projects, Nolan is preparing a collection of his best horror/suspense fiction, *The Eyes Of Night*, and has just completed a sequel to his first "Sam Space" novel, this new one to be called *A Case For Space*. "Also," adds Nolan, "I will be opening, by 1980, a luxury mobile home park in 'Space City'—Alamogordo, New Mexico. It will be called 'Sanctuary Park' and be based entirely on a Logan motif. Should be a unique tourist attraction."

If it seems that Nolan has so many irons in the fire that there's no room for the fire, be assured that not all of these projects occupy him at the same time. Even if they did, Nolan might manage the load; he exudes energy (Ray Bradbury speaks of his "nitro-glycerin intellect . . . Nolan invented nuclear fission inside his own head long before anyone dreamed of such explosions!"); he talks fast and with disarming organization of thought. His work habits are disciplined, if somewhat odd (since he prefers to work in all-night coffee shops from midnight to dawn, writing his first drafts in longhand).

And while Nolan continues to write in and *out* of the SF field (his Young Adult work has been cited by the American Library Association, and he has twice won the Edgar Allan Poe Special Award from the Mystery Writers of America) science fiction is clearly his first love. He was recently awarded an honorary doctorate "for his career contributions to the science-fiction genre," by the American River College in Sacramento, California.

Nolan offers positive thoughts on the genre as an art form: "All good writing is art, and that certainly includes science fiction. But I see it first as entertainment. If it captures the imagination it will stir the mind. SF *can* be an instrument for social commentary—but not, I think, for actual social change. It can only point the way. My own SF is split between pure entertainment [the Sam Space novels] and suspense-adventure/-social commentary [the Logan novels]. In general, I think the SF field takes itself far too seriously. I love humor and satire—Sheckley, Goulart, Vonnegut — and I often employ it in my own SF. I also favor the speed of narrative, and experience a real joy in fast-action writing, ala Max Brand. His work was a strong influence on my style—and I collected all of his westerns during my teen years. Later, as I got into SF, the novels of Alfred Bester became guideposts in style. There's a lot of Bester in Logan."

Nolan counts many top SF writers among hs personal friends (see his dedication to *Logan's World*). Among them is Ray Bradbury, who helped Nolan make his first SF sale.

"I met Ray in 1950. He liked what he saw of my work, and offered to read more." In 1953, when Bradbury was in Ireland working on *Moby Dick*, Nolan sent him a new short story, "The Joy of Living." Bradbury wrote back to say that this story—a love affair between a lonely man and a gentle android woman—was beautifully written, a wonderful idea, but that the ending was all wrong.

"I had the man, at the end, return the mechanical woman to the factory," says Nolan. "Ray claimed there was no reason for him to do this, and described the ending he thought the story should have, a poignant ending with the man recognizing that the android was capable of human emotions and deciding to keep her forever. I rewrote it with Ray's ending and immediately sold it to *If: Worlds of SF*. It was the first SF short story I had ever submitted, and I framed a photo of the $100 check that came with its acceptance!"

"The Joy of Living" also became Nolan's first teleplay. In 1971, he adapted it for Canadian TV. Produced by Norman Corwin, it was telecast that October. This same story surfaced again in Nolan's 1974 SF collection, *Alien Horizons*, and has been anthologized around the world in *The Pseudo-People*. In all, it has seen 19 printings in 24 years. Not bad for a first story!

But one sale does not a career make—and it was not until 1956, following the fruit of several major sales to *Playboy*, that Nolan ventured into what he calls "the shark-filled sea of full-time writing." His final career choice came as a surprise to many of his friends and

Photo: MGM

Photos: courtesy William F. Nolan

Photo: MGM

Above: two scenes from the *Logan's Run* feature film. Above left: author Nolan visits the "love shop" set. The entire concept of Logan came about quite accidentally. Scheduled to speak at a local college, Nolan began toying with the concept of life beginning at 40. After twisting it around a few times, he finally wound up with "death begins at 40." When he returned home, he started writing. Eventually, *Logan's Run* emerged.

"During the early 1950s I got into science fiction. Once the virus settled in, I was infected for life."

relatives, who knew William Francis Nolan of Missouri as a commercial artist. He had studied at the Kansas City Art Institute and had designed Hallmark Cards in K.C. before setting out for a new life in California.

"In San Diego, during the early 1950s, I got into science fiction," says Nolan. "Once the virus settled in, I was infected for life." He was a co-founder of the San Diego Science-Fantasy Society, helming the 1952 Westercon in that city—and was editor/publisher of the *Ray Bradbury Review* that same year.

Once committed to the financially insecure life of a free lance professional, Nolan wrote whatever he found would sell: interviews with Hollywood personalities, articles about auto racing (a personal hobby of his), book reviews, mystery stories and full-length biographies (he wrote the first published books about John Huston, Ray Bradbury, Dashiell Hammett, Steve McQueen and Grand Prix champion Phil Hill). During that time, he read voraciously and taught himself the finer points of science fiction. He began and abandoned three separate SF novels, which later supplied material for a single short story, "Starblood." Trial and error. Failure and success.

Up to now, among his 30 books, Nolan has published three SF novels: *Logan's Run* (1967), *Space for Hire* (1971) and *Logan's World* (1977). His short fiction stories include *Impact 20* (1963), *Alien Horizons* (1974) and SF anthologies between 1965 and 1971.

Several of Nolan's movies-of-the-week for television are borderline SF/fantasy: *The Norliss Tapes*, with Angie Dickinson, *Trilogy Of Terror*, with Karen Black and *Slaughter House* (yet to be filmed) based on a Richard Matheson story. *Burnt Offerings* (for which he wrote the screenplay) starring Bette Davis, won the Academy of SF, Fantasy and Horror's top award as "Best Horror Film of 1976"—the same year the Academy named *Logan's Run* as best SF film. (His work has also won two Gold Medallions at film festivals in France and Spain.) And Nolan's extended version of the Henry James classic ghost story, *Turn Of The Screw*, was filmed in London with Lynn Redgrave. ("I consider it my best script!")

As the tape recorder purred away on the table in front of him, Nolan told us the full Logan story:

"Fifteen years ago, in the summer of 1963, I was invited to address a class in science fiction at UCLA. There were probably no more than three other classes like it in the country at that time, and the students were all new to SF. I needed to give them a very rudimentary example of the difference between fiction and *science* fiction.

"That summer I was functioning as managing editor of *Gamma*, a California-based science-fiction magazine which was intended to compete, on a quality level, with *F & SF*. Distribution problems later killed us—but, in '63, I was the only SF editor in the Los Angeles area, which was why they wanted me to talk at UCLA.

"Anyway, while driving over there, and trying to figure out an easy way to explain the difference between straight fiction and SF, I conceived the whole basic idea of *Logan's Run* without even realizing it. In talking to the class, I said: Let's take the old saying 'life begins at 40' and look at it in terms of SF. If you write about a man who turns 40 and rebels, divorces his wife, begins a new life style, etc. then you have written a 'straight' fiction story. But if you reverse the idea and postulate a society in which *death* begins at 40, you are into a science fiction story. In such a society, facing the problems of over-population, the citizens might not be *allowed* to live past 40. Your story might be about, let's say, a policeman in this society who enforces the rule of death—until *he* turns 40 and has to die.

"Returning home from UCLA that afternoon, I thought about writing a short story dealing with the theme — about a protagonist who turns 40 and runs. A future cop, who uses all of his knowledge of the system to stay alive: the hunter being hunted . . . I didn't have a name fo him, but when I eventually needed one my subconscious supplied it—based on our home phone number in Kansas City: LOgan 6466!

"At that point, I thought I might make maybe 50 bucks on the idea as a short for *F & SF*—but it was soon forming itself into a novelette. I wanted to fully develop this society and this man, do something really original with them. But I still didn't have it all together in my mind. The seeds were there, but they needed planting.

"At George Clayton Johnson's home one night, I discussed the idea. George was into TV in those days, he had done some stuff for *Route 66* and *Twilight Zone*. He'd also written a film, *Ocean's 11*, and his thinking was geared to scripting. He suggested we team up and do a spec screenplay based on my idea and character. Spec meaning without pay, in the hopes of a studio sale. I shuddered, knowing how many unread scripts were piled on the desks of producers. Instead, I proposed that we write it as prose narrative, in extremely visual terms, keeping it fast and colorful. A kind of screenplay in novel form. There was one basic problem in this: neither of us had ever written a novel.

"We fretted about it for two years . . . We'd meet every few months and talk about the idea, having reduced our future death age to 21. Finally, in the summer of 1965, we decided to write the damn thing on a now-or-never basis. But we needed isolation. George had to get away from his wife and kids; I had to get away from my friends. 'Look, George,' I said, 'I'm going to rent a motel room in Malibu down at the beach.' Since we both lived in the San Fernando Valley I laid out a plan: 'I'll sleep in the motel at night and you meet me there every morning. You can drive back to your family each evening. We'll work at the motel ten to twelve hours a day until we have a draft.' He agreed.

"So that's what we did. We'd spell each other at the typewriter, me pacing while he typed, and vice versa . . . going to lunch at seaside restaurants . . . looking out on the ocean and saying: 'What about an undersea city that Logan runs to? There could be food processing plants down there!' We'd scribble notes on paper napkins, then rush back to the motel to pound out a chapter . . .

"All good writing is art, and that certainly includes science fiction. But I see it first as entertainment."

"It was a frantic, white-heat kind of job. Three weeks later we had our 50,000-word rough-draft manuscript. Since George was primarily a script-writer, and I knew that the novel needed a cohesive narrative style, I rewrote it, cutting, melding, arranging, etc. The final version was mine.

"People have often asked me how I could work with another writer, remarking that George and I are such different types. That's true now, but we've both changed a lot. Back in '65 we shared basic values; our thinking was very much along similar lines. It was as if a single two-part mind had invented the various story elements in *Logan's Run*. Therefore, in looking back, I'm happy to acknowledge George Clayton Johnson's invaluable contribution to Logan's initial success in book format.

"It took a while to get rolling. The novel was published in hardcover by Dial Press, late in 1967. Dial had never done a science-fiction novel at that time, and they just didn't know what to do with our book. They didn't know how to package or sell it. A very bad painting was used on the cover—of a blobbish, rubbery city (*their* idea of the future) through which ran Logan and Jessica, looking more like cancer victims in their sixties than like the 21-year-olds they were supposed to be. With this awful jacket, and *no* ads from Dial, the book died in hardcover, barely selling out its one printing of 5,000 copies. [Today it is a $50-a-copy collector's item.]

"But the reviews were fabulous. It got mainstream coverage—unheard of for SF at that time—in the *New York Review Of Books*, the kind of critical attention every writer dreams of. Other major cross-country papers praised it. In fact, 95 percent of the reviews were raves! And we got the same reaction overseas.

"We sold paperback rights to Dell, in 1969. Their edition sold close to 90,000 copies, which was excellent for a novel with no movie to boost sales. When paperback rights reverted to us from Dell, we sold it again to Bantam for a $55,000 advance! For *second* paperback rights this was a terrific price. By then, MGM had purchased film/TV rights for $100,000, but the project had stalled due to studio management changes.

"Then, in November of 1973, MGM's new president announced that their first major film, produced with an eye to getting MGM back on a solid financial footing, would be *Logan's Run*. Major stars. Major budget. The studio poured about nine million into it, more than they'd spent on any film in over a decade. It became their major release for 1976.

"Today, with the runaway box office success of *Star Wars* and *Close Encounters* it's easy to forget that Logan, too, was definitely a hit. Not a runaway—but it did make several millions in profit for MGM. And it was big in Europe and Japan. It paved the way for more popular SF films.

"When I wrote *Logan's World* as a sequel I hoped that MGM would want to film it—but they plunged right into TV with Logan, bombed out with the series, and now won't touch a theatrical sequel. But I have the right to sell it elsewhere as a film, and intend to do just that. In due time.

"I might as well talk about the series. The readers of *Future* will want to know how I feel, since I've kept quiet about it in the press until now. First, let me say that if MGM had done my sequel, *Logan's World*, as a follow-up film—and *then* taken the character to TV, they would have had a total three-way success. But they went for the fast dollar—and lost.

"While the film was still in world release the studio began talking to Saul David about producing a Logan television series. Though he'd done several other films prior to *Logan's Run*, Saul had no TV experience. He phoned me and said, 'Bill, how would you like to co-write the series pilot for *Logan's Run* with me?" I told him that I thought the whole project was ill-timed, but since there *was* going to be a TV pilot, and since I could not stop it legally, I might as well take advantage, creatively and financially, and help shape the course of the show.

"Saul and I worked out a plot and basic format. I created the android, Rem, because I knew we'd need a companion for Logan, naturally, and Jessica—someone logical and good with machines, who might ideally be a machine himself. My name for the fellow was Omo—operational machine organism. Everybody loved it, except in England, where it is the name of a leading kitchen detergent! So it got changed to Rem—a name I had originally created for one of the villains. Actually, the concept of Rem worked better than anything else in the series and I'm proud of having created him.

"At the outset, Saul and I insisted that we had to have a 90-minute pilot, not just an hour-long one. We felt the need for extra time to establish the characters and 'outside world' situation. But CBS insisted on a 60-minute pilot, so we wrote it at that length.

"Then Saul began to tell me about the sorts of problems he was having with MGM. No sooner had we completed our script than Saul was fired by the studio, and Logan was yanked out of his hands. He sued them for two million! I was stunned, left in the middle . . .

"The studio hired Ivan Goff, Ben Roberts and Ira Steiner to take on the Logan series. Goff and Roberts had an impressive background as writer/producers—with *Mannix, Charlie's Angels* and so on. They possessed commercial know-how. Under them, I figured the damn series might run ten years, with $500 in royalty money flowing in to me each week!

"But I had my doubts. Goff and Roberts had never done any science fiction, which is usually the kiss of death. You *must* understand SF to write or produce it successfully. And it's not a field you can master over the weekend. They called me into their offices, asked how I wanted to be involved. I said that I didn't want to be involved at all — beyond a prior commitment to help write the first episode following the pilot show. The terror/suspense writer, Dennis Ethison, was hired to co-script "The Thunder Gods" with me. As Goff and Roberts rewrote the pilot script—I counted just one line of Nolan/David dialogue in the final—Dennis and I labored on "Thunder Gods." To no avail. It was a doomed idea that never

In San Diego, Nolan pauses to chat with "his people," members of the Logan's Organization of Fans. The author relishes close contact with his youthful cohorts.

got beyond its outline. Ira Steiner kept making major changes. Dennis made changes. I made more changes. Goff and Roberts made changes. Finally, CBS turned thumbs down on it—much to my relief. I had *never* wanted to do episodic TV, not even for my own series. The episodic writer is low man on the totem pole in the TV/film industry. It's a creative and financial dead end. Once you're in that pit you never get out!

"After this, I stepped completely away from the Logan series. But there's a footnote: one day, several weeks later, I got an envelope from MGM containing 30 pages of new script by Leonard Katzman, the show's line producer. CBS had seen the 60-minute pilot and ordered an additional half hour, which Katzman quickly supplied. He tacked on the whole awkward middle section about the 'Riders' on horseback in their silly hats. In this Katzman sequence we have these Riders sitting down at a lunch table still wearing their stupid helmets, after having hung up their stun guns on the wall . . . that kind of nonsense. In *our* version, Saul and I brought Logan and Jess into a room to face the Masters of the stone city, an entire King Arthur-like court of skeletons ringing an enormous roundtable — all being royally waited on by robots who eternally continued to serve them, even though the human Masters were long dead. Death was not an understandable factor to these machine-people. The scene was meant to be shocking and ironic. And what they did they do with this? They propped four seedy skeletons on a ledge in the corner! Just one example of the way things get watered down.

"I had severe misgivings about the series from that point forward, so it didn't surprise me when Logan was cancelled. Financially speaking, I was unhappy when CBS lowered the axe, chopping $500 a week out of my income, but artistically the series deserved to fail. It just didn't make the grade beyond its basic production values, which I thought were much better than *Star Trek*.

"Let me say, finally, that CBS may have killed the Logan series, but they haven't killed Logan."

Photos: courtesy William F. Nolan

In Canada, William F. Nolan confers with producer Norman Corwin concerning Nolan's science-fiction tale, "The Joy of Living." Before turning to science fiction, the prolific author wrote straight fiction and biographies.

Indeed, they have not. Nolan's character has already run through two novels, a blockbuster MGM movie, seven issues of Marvel comics, a CBS pilot and 10 television episodes (most of which had *some* redeeming qualities). In paperback alone, over a million copies of the Logan novels are now in print. There's even an official Logan fan club!*

Logan the running Sandman has earned the status of a 1970s mass-culture hero. And with yet another novel due—and a hoped-for film on the horizon, Logan lives!

As does his prolific, multi-talented creator, William F. Nolan.

You can bet they'll *both* be running hard into the 1980s!

*For information, write to Fay Popejoy, Logan's Run Organization of Fans, 1399 Ninth Ave. Apt. 718, San Diego, California 92101.

Investigating space with Jesco von Puttkamer

Civilizations Among the Stars: What Are the Prospects?

In the last issue of FUTURE, this column discussed several aspects of the Search for Extraterrestrial Intelligence (SETI), recently proposed by NASA as a systematic program for radio-astronomy, spanning several years.

As early as 1971, a study group under Bernard Oliver, sponsored by the NASA Ames Research Center, advanced Project Cyclops, a large ground-based phased-array radio telescope of 10 km. diameter, consisting of 1026 dish antennas each 100 m. across, all electronically steered by a complex computer system. Cyclops could detect a 10^9 watt beacon at a mind-staggering distance of 1000 light-years (LY) if that supercivilization were sending in the cosmic "quiet zone" of the microwave spectrum, or leakage signals from a Type I race to 100 LY.* The frequency range preferred for the search originally proposed by Cocconi and Morrison, lies between 1400 and 1727 megahertz (17-21 cm. wavelength). The region has been called the "water hole" because it is bounded by the spectral lines of the water components hydrogen and hydroxyl (the OH ion), and it is hoped (perhaps chauvinistically and erroneously) that other civilizations, dependent on water presumably as much as we are, might broadcast their signals in that rance to facilitate the search. At these frequencies, Cyclops could detect a signal as weak as one photon per second *per square kilometer.*

Cyclops may also be built in space or on the backside of the Moon, but becaue of its high price tag (ranging up to $10 billion depending on its evolutionary growth over the years), the more recent SETI study set its sights much lower. It is proposing a more modest project, starting with existing antennas and working itself up to a larger ground- or space-based systems if it should become necessary to widen and deepen the searcn. The task would be rendered manageable by a new multichannel spectrum analyzers for, initially, examining a million and later a billion frequency "slices" simultaneously. As its name implies, SETI will limit itself to basic reconnaissance: it intends to listen rather than to transmit, to search rather than to announce.

We may speculate that the omnidirectional beacon, which we assume to exist somewhere out there in space, would not only transmit—for as long as a thousand years, perhaps—a wide-band call signal designed to reliably establish the source as an artificial object from a tremendous number of natural radio sources in the universe, but also an interspersed narrow-band stream of information with some repetition cycle. This way, reception of the first "batches" of information would not have to await our acknowledgment of having acquired the call signal. Of course, even if we succeed in decoding and understanding the message, we may not comprehand its meaning! Intelligibility is the ability to tell what the message is saying; comprehension requires the ability to translate the message into images of real situations familiar to us.

What if the originators of the message are so totally alien that the message remains incomprehensible? As I have said in a previous FUTURE issue (#2), we should restrict our search to biological forms at least similar to us in basic metabolic dependence on carbon-containing molecules and water.

This restriction is not quite as narrow-mindedly chauvinistic as it may seem.

While silicon has been regarded by some (especially science fiction writers—remember the Horta from *Star Trek*?) as another likely candidate for a base of life in the universe where its abundance is as much as one-fifth that of carbon, only carbon is known to form such highly complex molecules as proteins (from amino acids) and nucleic acids (from sugars and nitrogenous bases, i.e., nucleotides) which can store and transfer the energy and the information that life appears to require to live up to its basic definition as a system of matter having mutability and heritability.

But while being "carbon chauvinists" about extraterrestrial biochemistry, we do not presume that its products would necessarily look like terrestrial forms, easily comprehensible to us. In fact, due to the randomness of biological evolution, they will almost certainly be different. Chauvinistically speaking, the bestiary out there, if any, will be exotic in the truest sense of the word!

For example: do they require an oxygen atmosphere? Not necessarily. Even on Earth there are many life forms, such as certain bacteria and protozoans, which use inorganic materials for metabolic chemosynthesis without oxygen. And, of course, there are those plants that use photosynthesis. While life on Earth almost certainly originated in a primeval non-oxygen atmosphere of hydrogen, amomnia, water vapor, and methane, higher life forms would have had a hard time to make a living if that atmosphere hadn't changed, over the

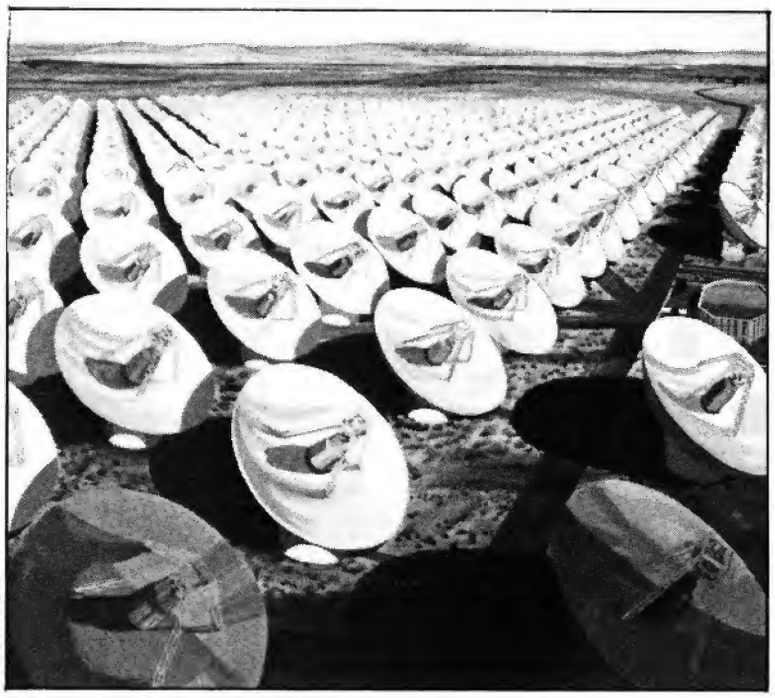


Photo: NASA

Hypothetical array of 1,026 antennas proposed for Project Cyclops. Each dish would measure 100 meters across and be controlled by a central computer system in order to simultaneously track radio signals.

*For more on N.S. Kardashev's classification of supercivilizations, see FUTURE issue #3.

Jesco von Puttkamer is Program Manager of Space Industrialization and Integrated Long Range Planning Studies at NASA. He is also the science advisor for Paramount's forthcoming ***Star Trek*** *movie.*

millenia, to an oxidizing environment. That is because oxidation (combustion) of sugar (glucose, $C_6H_{12}O_6$) into CO_2 and water liberates over eleven times as many calories of energy as the fermentation of glucose into ethyl alcohol and CO_2 in a reducing atmosphere (like Jupiter's, for instance). Beings on such a world, to derive the same amount of free energy, may conceivably be too preoccupied with foraging for food to develop a higher mind, technology, and civilization.

Still, such beings may of course be endowed with intelligence. But while technology is neither necessary nor sufficient for intelligence, all intelligence based on some form of genetic memory (genetic code) that wants to grow into society and civilization, must sooner or later apply natural laws through technology and engineering to assure its survival and to protect its evolutionary potential by dealing with its environment, expanding and diversifying it.

Inter-species communication with extraterrestrial creatures by electromagnetic waves over interstellar distances, as we have seen, is severely limited by such factors as (1) extreme time intervals for two-way transmissions, (2) fundamental differences in biological and social evolution causing difficulties in message comprehension, (3) lack of physical contact for biological research and exchange of material objects, (4) inability to contact less developed races and to explore nonintelligent life forms and physical phenomena in the universe, and (5) absence of that special sense of adventure and excitement which comes with physical expansion and exploration.

If interstellar spaceflight were possible, these limitations would dissappear.

With our present-day technology, we are still aeons away from making starflight a practical proposition for humans. Let's face it: the distances to be traversed within reasonable flight times are simply too large. The reaction mass and energy required for the trip even to the nearest stars, the triple-star system of Alpha Centuri (4.3 LY) or Barnard's star (a dim red M5 dwarf about 6 LY away), are too great to be contained in a manned rocket. Using the most advanced spaceship engine concept currently foreseeable, controlled thermonuclear fusion with laser ignition, we could make the round-trip to Alpha Centauri in 82 years. Racing along at a maximum clip of 10% of the speed of light—18,750 miles per second—we would burn up about 81,000 tons of propellants to drive a 10,000-ton ship. Even with the ultimate rocket propulsion system, the photon rocket with matter-antimatter annihilation and zero-loss conversion of the liberated energy into photic propulsion thrust, which could achieve velocities close to that of light, the Alpha Centauri run would take 10 years both ways, and a 1000-ton ship would have to annihilate 33,000 tons of matter enroute, release some 3×10^{31} ergs of energy which, at 0.1 cent per kilowatt-hour, would represent about 900 trillion dollars worth of nuclear fuel.

Sending out unmanned interstellar probes on one-way voyages would be an alternate and easier way of establishing physical communication. One concept, proposed by a study group of the British Interplanetary Society, is Project Daedalus, an interstellar probe to Barnard's star. The design calls for a two-stage rocket, both stages powered by nuclear fusion reaction engines using pellets of deuterium and helium-3, ignited by high-powered electron beams. The 4000-ton probe would require 50,000 tons of propellants and travel at 12% of the speed of light, taking some 60 years for its mission. Such interstellar probes could be launched by extraterrestrial intelligences, too. Ronald Bracewell of Stanford University, who first discussed this possibility, has suggested that we be alert for such probes (so-called "Bracewell probes") in our own solar system right now. In science fiction, Arthur C. Clarke used the idea for the film *2001: A Space Odyssey*.

(to be continued)

Photo: NASA

Arecibo Observatory in Puerto Rico boasts the largest radio/radar telescope on Earth. The dish measures 1,004 feet in diameter. Arecibo could be used to send coded radio messages from our planet to galactic listeners.

They once claimed some of the highest seats that a man could take—in space. Now, they all sit behind desks. But wherever they are, they're still—

Sittin' On Top Of the World

The Group I Astronauts, then and *now* . . .

by JAMES C. ODELL

During the sixties, no other group of men held the public eye to the extent the Group I astronauts did. Seven men: Scott Carpenter, Gordon Cooper, John Glenn, Gus Grissom, Walter Schirra, Alan Shepard, and Deke Slayton; an elite corps, a unique group possessed of an extraordinary common destiny.

Among them, they totaled over 969 hours in space. But the number of accumulated hours they spent dominating all three national TV networks is probably incalculable. The days on which their names and their adventures captured newspaper headlines around the world during that decade probably outnumber any other single political body, corporation, athletic team, or business organization put together.

And beyond the debate that intellectuals waged over them—were these men legitimate heroes or simply thoroughly programmed automatons—one fact remains.

When they left the Earth's atmosphere, America (and most of the world) held its breath. The seven men staked a claim to a fertile chunk of this planet's collective consciousness—for over a decade.

They were in their prime; young and athletic, they each combined highly-trained analytic intelligence with strong bodies, able to endure the crushing rigors of early space travel. Their minds were keened on the challenge of space during that decade; their fortunes rose and fell in dramatic sequences. They walked in space, on the surface of the Moon, and even on a Russian Soyuz spacecraft. And they fell in bathtubs, underwent surgery, and sat behind desks in Mission Control, wishing they were in orbit. One man, Gus Grissom, died in a simulated flight-test for the Apollo 9 Mission. Another man—John Glenn—is now a United States Senator from Ohio. Their fortunes rose and fell—and rose again.

The Group I astronauts were the first men named to fulfill John F. Kennedy's promise that America would lead the world in space. Stimulated by the spectacular Russian Sputnik launch and orbit, these men picked up the American baton and raced with it towards the Moon. Their adventures along that route are now legend. But where are the seven men now, and what are they up to?

Behind the Desk

Alan Shepard, the first American in space and the fifth man to ever walk on the Moon, was perhaps the most glamorous of the group; his headlines on May 5, 1961 were probably the deepest. Between his first solo flight and his lunar exploration ten years later, Shepard suffered an inner ear infection that made his flight status rather ephemeral for a time. He was Chief of NASA's Astronaut Office when he wasn't on active flight status, and he retired from NASA, officially, in 1974. He is remem-

Photos: NASA

Group I astronaut Wally Schirra poses at left, in front of early Mercury craft. Above: The dramatic October 3, 1962 lift-off of *Sigma 7*.

bered for, among other things, having driven a golf ball further than a bionic Arnold Palmer—while wearing his space-suit on a lunar perambulation. Shepard got the idea from Bob Hope, who visited the training astronauts in Houston carrying a golfclub and a couple of one-liners about teeing off on the Moon.

Tody, Alan Shepard sells beer. Not just *any* beer. He sells *Coors* Beer.

"I felt it was important for me to make a decided change rather than to try to hang on to the 'good old days'," says Shepard. "So now, I'm in beer and real estate." Before coming to the Windward Corporation, which owns the Coors license in Texas, Shepard worked for a Houston brokerage firm and then a construction company, which built K-Mart markets—among other projects. But space is something he will never get out of his system.

"I would love to take the Space Shuttle—as a passenger—in the 80s. And I still fly airplanes."

Shepard also still keeps tabs on Deke Slayton, who is now Director of Flight Operations for Shuttle Approach and Landing, and the only Group I astronaut still actively connected to NASA. Slayton, like Shepard, spent part of his Group I days grounded, due to a heart flutter that was detected in 1962. Fiercely determined to go into orbit, Slayton achieved his goal in July of 1975, aboard the joint U.S.-U.S.S.R. manned mission. Having done that, he accepted the desk NASA offered him, directing the Test Program for the Space Shuttle Orbital Flight. Deke, first and foremost a *pilot*, relishes his new responsibilities.

"When you're not flying, you're behind the desk. Unfortunately, that's what everybody's doing these days," he reports. Deke Slayton would also purely *love* to fly the Shuttle craft himself.

"But you can't very well manage and fly at the same time. It doesn't fit too well. You've got to dedicate yourself to one side; you can't do both," the Shuttle Test Flight Director says. When will he begin to actually test the Shuttle?

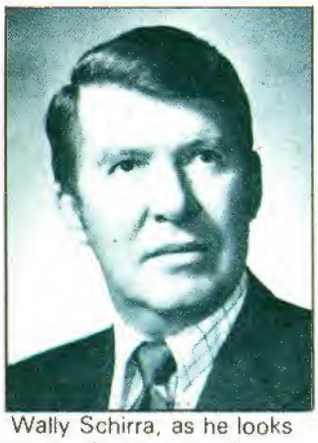
"The first test vehicle is still being built. It'll be down on the Cape this fall ('78), probably October-November time. We're looking for our first flight next Spring, about a year from now. We've got, as you would guess, a hell of a lot of ground tests going on and all that. But we won't be doing any more flight testing for about a year."

Asked to reminisce about his Group I buddies, Slayton says "We are spiritually a group, and we even get together as a group from time to time. I enjoy that a good bit."

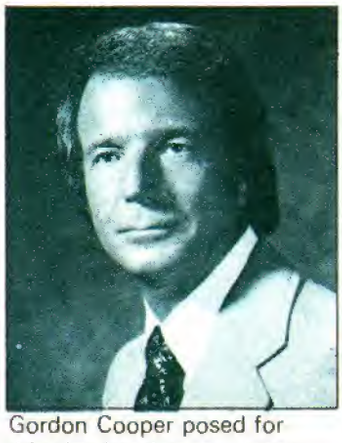
When they do get together, Scott Carpenter travels to the reunion from Los Angeles, where he is an executive for Maxon Industries. Maxon makes garbage compactors, and garbage is something that has interested Carpenter ever

The astronauts in NASA's Project Mercury manned orbital flight program are shown in the Mercury Control facility at Cape Canaveral. From left to right, Schirra, Slayton, Grissom, Craft, Cooper, Carpenter, Glenn, and Shepard.

Photos: NASA

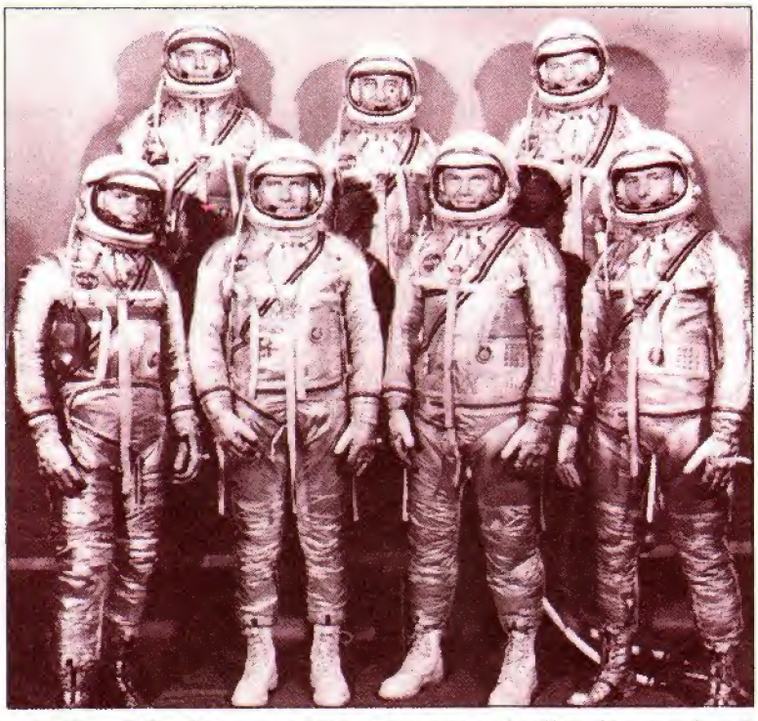


Wally Schirra, as he looks today. Schirra, now 55, lives in Colorado.



Gordon Cooper posed for this simulated space atmosphere picture in 1962.

Scott Carpenter today. Carpenter is an executive in California.



Right: the seven Project Mercury astronauts in space suits, posing for a 1963 NASA publicity photo. The 7 original men, who are now 6 with the death of Gus Grissom, still regularly enjoy reunions, getting together whenever their busy schedules allow. "We are still spiritually a group," says Deke Slayton.

since he left NASA in 1967 to join the U.S. Navy Sealab project. Before joining Maxon, Carpenter worked with the highly futuristic Pyro-Sol Corporation in California, which had developed a way to convert old automobile hulks into electricity. During the time Carpenter was with the firm, they invented a process that took compacted municipal waste (of which 17,000 tons a day are generated in California) and converted *that* into juice that will soon be sold to Pacific Gas & Electric. Scott Carpenter has become something of a synergistic waste-disposal expert.

"At Maxon, I head the division that makes compactor bodies for trucks. I guess I'm pretty deeply involved in waste-disposal problems—we make the truck chassis' for the rubbish industry as well." (Needling Carpenter for his garbage disposal expertise, fellow astronaut Walter Schirra says "Oh, Scott's just the person for *that*. They've got the right fellow for the job.")

Scott Carpenter, like Alan Shepard, sees absolutely no relationship between his days in space during the 60s and his executive position in the 70s. "If there *is* any connection, it escapes me," says Carpenter. But the former Mercury-Atlas 7 pilot, the fourth American in space, is still actively working amidst the nuts and bolts of the future. Municipal waste will become quite a thorny problem as cities produce more and more trash, and run out of places to put it.

Among his astronaut friends, Carpenter is perhaps closest today to John Glenn. "John and I have a very close relationship because of the first flight, when I was his back-up. But I see the whole bunch of them and, sure, I think I am part of a very special group."

Joining Scott Carpenter in mining the veins of the future is Gordon Cooper, a man whose current job perhaps comes closest to matching his former occupation—astronautics—in daring and imagination.

Gordon Cooper, at 51, is now one of the "Imagineers" (Imagination & Engineering) working for Walt Disney, Inc. on the planning and development of EPCOT—"The Experimental Prototype Community of Tomorrow." EPCOT is now in the midst of a typical Disneyesque planning sequence (Disneyland, for example, was constructed from Master Plan #67, and Walt Disney World from Master Plan #17) that has so far stretched to the creation—and revision—of 5 Master Plans. The new park will be made up of acres of pavillions, exhibits, rides (a *Future World Travel Port,* a *Spaceship Earth* show), all striving to extrapolate present technology towards future reality. In true Disney style, the entire park will conform to a high degree of scientific accuracy, while allowing enough room for the imaginations of the Imagineers to construct as inspiring (and as commercially viable) a vision of the future as possible. And L. Gordon Cooper, listed in the Walt Disney 1977 Annual Report as Vice-President of Research and Development, will have a great deal to do with the shape of the future EPCOT, and with all the Master Plans it takes to determine that shape.

"Well, you know, throughout the whole space program we were always operating in really way-out advanced technologies, and developing things as we went along. I think I'm still operating that way. Disney's always been a very progressive company. It's always been way out in front technologically," says Cooper of his new post.

Cooper was known as an astronaut who was quick with a quip, and was perhaps the most serendipitous of the Group I men. Before his first Mercury flight, he was asked to demonstrate for TV cameramen how an astronaut might actually disembark from a van and enter a gantry elevator for launch. Completely clad in his spacesuit, Cooper complied with the publicity request from NASA, but added one little flourish of his own. With major network cameras rolling, and press photographers from

around the world snapping away, Cooper pretended to 'break down' before entering the launch elevator. In mock horror, he squalled "No! I don't wanna go! You can't make me! I won't go!!", hanging onto the elevator door against any efforts to push him in. The press 'got' the joke, but NASA didn't.

That kind of humor, while not quite right for NASA ("Where everything gets done *twice*") may go pretty far at Walt Disney Enterprises. "I'm in the R&D group that does all the research for everything from new ride systems to new energy systems, new concepts, filming techniques, etc., for all the various Disney enterprises," reports Cooper. "For EPCOT, we're quite far along actually—almost the final design stage now."

Has Cooper interacted with his former buddies from the Group I days, regarding their own futuristic endeavors? "Yes, I sure have. I've stayed in touch with Scott Carpenter on their system and feel that certainly somewhere down the road it will be very applicable to demonstrate that system. Because certainly solid trash is municipal waste and it's a very high energy source." One of EPCOT's future attractions will be an *Energy Pavillion,* so the Cooper/Carpenter interface seems a natural. Both Group I astronauts are close to one another.

A close friend of Cooper's once said "All Gordon Cooper is, is a pilot. He's a good one and a smart one, and that's all he wants to be." That statement was borne out by Cooper's brilliant handling of his Faith 7 craft after his communications with Mission Control burned out. The first pilot who *had* to fly a spacecraft by the seat of his pants, Cooper earned high marks from everyone connected with the flight. It will be interesting to see how he pilots the development of EPCOT.

Fire

On January 27, 1967, the worst tragedy to befall the space program hit a team of Apollo astronauts testing their Saturn launch vehicle before take-off. A flash electrical fire broke out in the pure oxygen atmosphere of the command module, killing astronauts Gus Grissom, Edward White, and Roger Chaffee.

The Senate committee investigating the disaster claimed that a false sense of optimism prevailed at NASA at the time, making officials less likely to check out and prevent all possible likely disturbances to what had previously been a safe testing procedure. In any case, Gus Grissom, one of the original Group I astronauts, lost his life in the blaze. Grissom, America's second man in space, is remembered for the fierce sense of dedication he brought to his job, and he is sorely missed by the other Group I men. In a way, the disaster brought the other astronauts closer together, perhaps making them realize that space could have other costs than money could express.

The accident caused another serious setback: the Apollo launch program was delayed 18 months, with a direct cost of over $410 million. These were difficult times, but out of them a leader emerged; this man would not only become the *de facto* leader of the Group I crews, he would also go on to lead the state of Ohio in the United States Senate.

That's Senator, not *Commander* Glenn

John Glenn, America's first orbital astronaut, was always the sort of man people looked up to as a *natural* leader. A World War II hero (with 59 bombing missions and medals to show for them) and perhaps the most famous jet test-pilot to ever tip his wings (in 1957, Glenn set a transcontinental air-speed record by becoming the first man to fly from L.A. to New York at supersonic speed), Glenn's credentials were impressive. The other astronauts liked him, the press adored him, but most importantly, the Kennedys simply fawned all over him; he seemed to fit the Camelot role of warrior/adventurer to a "T." A photo of Glenn water-skiing with Jaqueline Kennedy appeared on the cover of *Life Magazine*, and Glenn was seemingly launched into the political arena. Glenn was a permanent fixture at Robert Kennedy's Hickory Hill estate for weekend partying, and was the only astronaut to ever regularly penetrate the social heights of private government affairs.

A bathtub fall made him drop out of his first Senate race in 1970, and Howard Metzenbaum defeated him in 1972, but John Glenn finally triumphed in 1974, becoming the junior Senator from the state of Ohio.

In July of 1976, he delivered the keynote address to the Democratic National Convention, but somehow Glenn could not find a good handle for the affair. Streams of delegates left the Convention hall during his address (only to return to perk up their ears for Barbara Jordan from Texas), much to Glenn's chagrin. Many political observers feel that Glenn lacks the flair for politics that he brought to test-piloting and astronautics; other observers wonder whether a flair for politics is something which reflects well on a man who would like to think himself decent. In any case, Glenn has a comfortable seat in Ohio, and a recognition-factor which has other politicians green with envy. Not too many people can claim to have orbited the Earth; only one man can claim to be the first American to do so.

Another former test-pilot/astronaut, Wally Schirra, has also managed to travel quite a distance from his Group I days. Wally, now 55, retired from NASA in 1969 to begin a highly active career in business; he teamed with Walter Cronkite to cover subsequent manned orbital launches and splashdowns; he appeared in TV commercials for railroads; he became chairman of Sernco, Inc., a Los Angeles-based environmental engineering firm; he became Marketing Director for Aerospace Sales at Johns-Manville in Denver, and eventually rose to Vice-President of their Sales Division. Presently, he seems to have slowed his frantic pace some, having taken a job with Goodwin Companies, which he describes as "a think-tank with venture capital."

"I have always been in the environmental engineering business and the question of *that* always comes around to a question of *energy*," he says. "We have one project right now that is on insulation of homes for the future. We are also working on solar heating systems. I'm Vice-President for Development on both these projects.

"I like going out and working with new technology. Not that Johns-Manville was that slow, but they were more of a commodity manufacturing company. I'm over here at Goodwin now because I want to get involved in newer ideas and concepts."

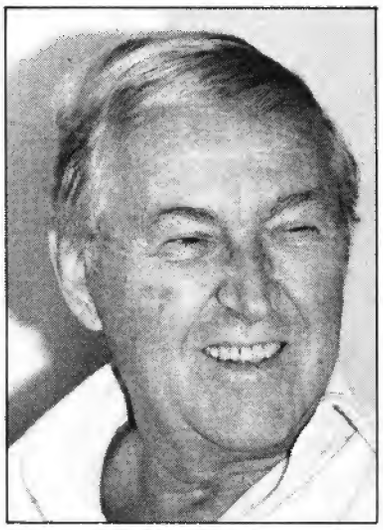
Schirra is probably the most active group social-director the Group I astronauts have, probably because he relishes the companionship of his former space chums. "In the last couple of days, I've spoken to five of the other Group I men," he said. It might be remembered that Schirra named his solo orbiter *Sigma 7*, in recognition of the seven men who were in his astronaut group, "I felt that *Sigma 7* would add up the inputs of many people—including Al Shepard, Gus Grissom, John Glenn, and Scott Carpenter, who had gone up before me—and show us exactly where we stood." This noble sentiment was rather unique amidst the solo-pilot bravura in the early days of the space program.

Maybe there is nothing really special about his group of seven men; maybe their achievements in and out of space, when measured against those of other high-management executive types, is nothing unique. And yet, meeting and talking to these men, one comes away impressed with a certain sparkle, a gleam in their eyes, perhaps not as present in other men of their social strata. Each of the Group I astronauts has achieved some measure of financial success and business stature. Each of them has also orbited the Earth. Some walked on the Moon. Others floated free in space, tethered to their crafts only by slim umbilical cords. They may not all be heroes, but they may just be the closest thing to a hero this country is likely to see for quite a while.

future forum

Future Forum is designed to expose our readers to the thoughts of a variety of experts in the fields of science fact and science fiction. Each issue we pose a question to our "guest panel" on a particular aspect of SF, space-age technology or future trends. This issue's question:

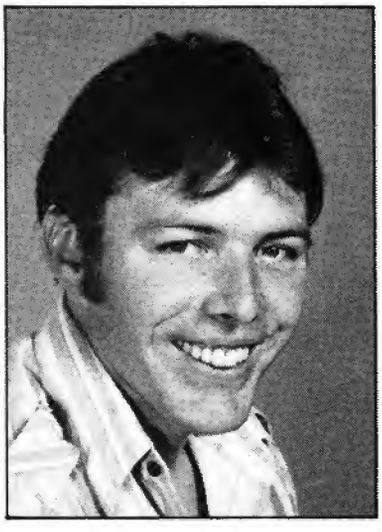
What is your favorite SF film, your least favorite—and why?



George Pal

Producer of *The War Of The Worlds, The Time Machine, When Worlds Collide* and *Destination Moon.*

My favorite SF film is George Melies' *A Trip To The Moon* because it was the *first*. My least favorite was *Rocketship X-M* and you figure out why.



John Bryson

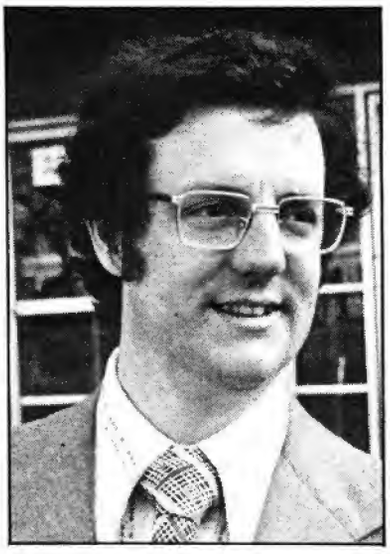
Director, U.S. UFO Research Laboratories Inc.

My favorite SF film was *The Day The Earth Stood Still.* Its message to mankind is still as relevant today as it was at the time of its release. The theme that integrity is the key to evolution, to me spoke a truth and a warning that has not as yet been taken all too seriously. Logic should dictate that in order for a race of beings to evolve to the point that they can master the laws of time and space, they first have to develop an emotional wisdom to equal that which had been gained intellectually—in other words, they must overcome the need to kill and destroy everything they don't understand.

Poul Anderson

Hugo and Nebula award winner, author of *Tau Zero, Three Hearts And Three Lions* and *No World Of Their Own.*

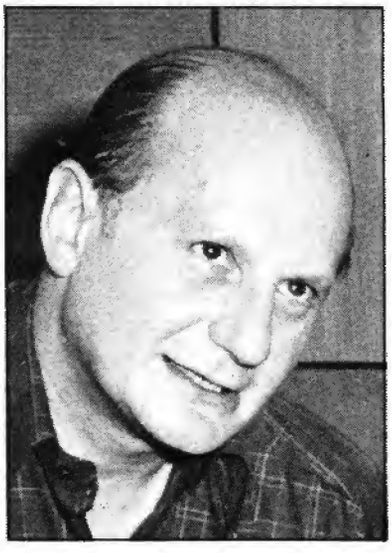
I haven't seen a lot of SF films, because most of them are so dreadful. Probably my favorite to date would be *2001*, although your editorial in FUTURE No. 1 certainly makes a case for *The Man In The White Suit*. (The two aren't really comparable, any more than a crisp apple and a brisk bit of surf bathing are.) The most awful turkey that comes to my mind was many years ago and had something to do with an expedition to Mars; there was one gob of gooey sentimentalism after another. I have mercifully forgotten the title.



Dr. Mark R. Chartrand

Chariman, Hayden Planetarium.

How do you answer a question like this? One is reminded of the "desert-island question to end all desert-island questions" one listener propounded on the Metropolitan Opera Quiz: If you had your choice of artists, labels, etc., what desert island would you pick?

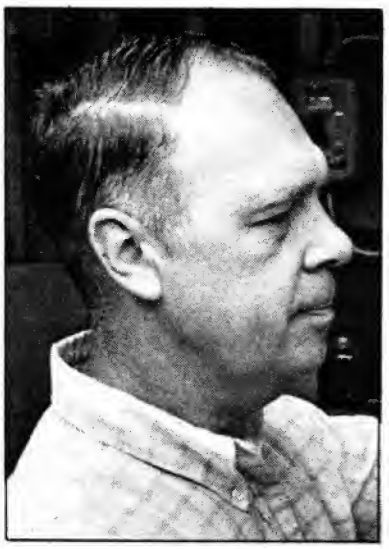


Gerry Anderson

Producer-creator of *Space:1999, UFO, Thunderbirds.*

My favorite SF movie is *Star Wars*. Its objective was clear—to entertain, and this it did magnificently. The worst

SF movie I have ever seen? Well, I'd hate to be that unkind. Perhaps the most disappointing SF movie I have ever seen was *2001*. It was like viewing the greatest dailies ever shot. The effects and sets were superb, but as I have learned to my cost—sets and effects do not a picture make. If the question had been 'What do you consider to be the finest movie that you have ever seen,' I would have replied 'Kubrick's *Paths Of Glory*.' I have always admired Kubrick's work. Perhaps when he turned to science fiction I expected too much.

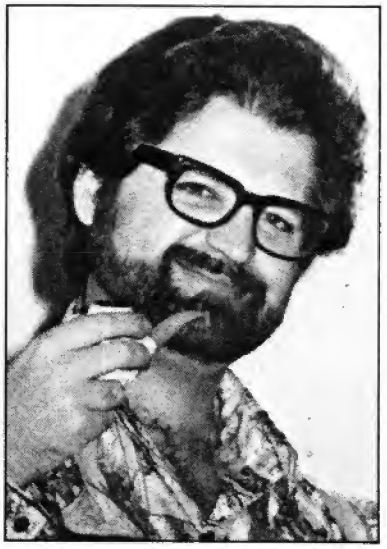


Hal Clement (Harry C. Stubbs)

Science fiction author and artist; author of *Mission Of Gravity, Cycle Of Fire, Needle, Iceworld* and the recent *Through The Eye Of A Needle.*

My favorite SF film so far has been *Close Encounters;* it boasted superb effects, an actual plot and reasonable behavior (granting the idea-planting abilities of the aliens) by the characters. This is in spite of the fact that I subscribe to the late Donald M. Menzel's views about UFOs, and have no use for the Bermuda Triangle mythos. Even Atlantis, after all, can serve as a basis for a good story, unscientific as its basic theme has proved to be.

I am less sure of my least favorites. I have missed a great many and have to go back a long time. Two prime candidates are *Rocketship X-M*, a quickie made to take advantage of the *Destination Moon* publicity, and something a few years later called *Red Planet Mars.* Both were calculated to turn off anyone with even a trace of scientific background. I recall no redeeming features in the way of plot, effects or acting.

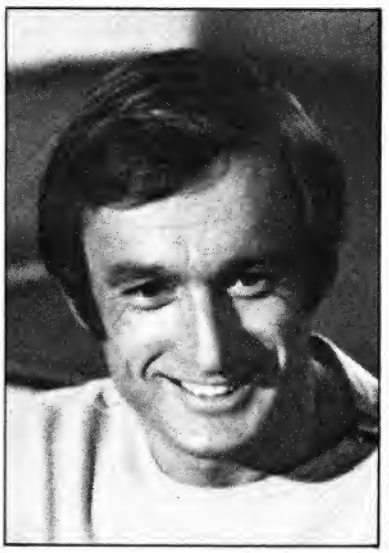


Larry Niven

Author of *World Of Ptavvs, Neutron Star, Ringworld, The Shape Of Space* and *All The Myriad Ways.*

I've got too many favorite films. Let me just name one which most of your readers haven't seen, so that they can watch for it. *Dark Star*. I won't say any more about it. Trust me!

My least favorite? There was a critter-movie called *Tarantula,* twenty-five years ago or so. My cousins and siblings used to watch it just to laugh at it, and they dragged me along a couple of times. To one who had seen *Destination Moon, Tarantula* was not amusing.



Nick Tate

Actor, best-known for his role of Captain Alan Carter on *Space: 1999.*

I haven't seen too many. I'm vitally interested by all kinds of imaginative stories where people use imagination, whether it be in the future or in the past. I love a good story. I'm a real sucker. I love sitting in the audience, cheering the goodies and booing the baddies. I'm a great audience. I would say *Star Wars* is my favorite film. Naturally, I love *2001*. I remember reading that George Lucas said that, for him, *2001* was still the most important space film. That's a very generous statement on his part. I also love things like *The Time Machine*, that sort of stuff. I'm not really an extremist. I'm the kind of guy that has a very broad scope of likes and dislikes. I don't really feel very strongly about anything in life.

Joanna Russ

Author of *Picnic On Paradise, Chaos Died, Female Man, We Who Are About To* and *The Two Of Them.*

My favorite is *2001*, a serious and brilliant film. My very least favorite is *Star Wars*, which threw away a chance at some very pleasant wonders and marvels by electing the stalest and silliest of plots. I suspect the film was made as a deliberate spoof (the last scene is a steal from the Nazi propaganda film, *Triumph Of The Will*) which ran away from the director, a man quite capable of intelligent film-making—as his other films prove. Now he's got a Frankenstein's monster on his hands and has to pretend it's "wholesome," as he said on TV. The film is liked precisely because it's sexist, racist and morally idiotic (has anybody thought of owning sentient robots in terms of slavery?) and therefore demands nothing in the way of thought or feeling except the self-glorification of "adventure." And, oh my word, all those shoot-'em-ups!

STAR TREK

The Motion Picture

After three years of planning, all systems are finally go on one of the biggest science-fiction films ever to emerge from Hollywood.

By GERALD MORRIS

Photos: Pat Lajko

Together again! Leonard Nimoy and William Shatner announce their involvement in the new *Star Trek* motion picture. The film is scheduled for a summer release in '79.

Star Trek—The Motion Picture is finally definite," Gene Roddenberry smiles from his cluttered office at Hollywood's Paramount Studios. Roddenberry, the creator of the original *Star Trek* television show, is obviously relieved that the on-again, off-again motion picture version of the legendary series is finally off the ground. For over three years, the sandy-haired writer-producer has fought the corporate powers on behalf of his prized project. As the studio flexed its bureaucratic muscle in fits of schizophrenic wonder, Roddenberry watched *Star Trek* rise and fall as a pre-*Star Wars* feature-length film, as a three-hour telefilm and, finally, as an aborted syndicated weekly television series. Then, two months ago, Paramount revealed that not only will *Star Trek* be transformed into a $15 million dollar SF screen epic slated for the summer of '79—but that all the original TV crew will be along for the ride.

Roddenberry, like most of SF fandom, is obviously relieved. For the first time in months, the aura emanating from his corner of the Paramount lot is tinged with sheer optimism. *Star Trek—The Motion Picture* is going to be a spectacular production, nothing short of a widescreen phenomenon.

Roddenberry beams with pride as he runs down the list of cast and credits for *Star Trek—The Motion Picture*. Once again roaming the corridors of the starship *Enterprise* will be William Shatner as Captain Kirk, Leonard Nimoy as Mr. Spock, DeForrest Kelley as McCoy, James Doohan as Scotty, George Takei as Sulu, Nichelle Nichols as Uhuru, Walter Koenig as Chekov, Majel Barrett as Nurse Christine Chapel and Grace Lee Whitney as Transporter Chief Janice Rand (promoted from Yeoman). Also on hand will be Persis Khambata as the newest member of the ship's crew, Ilia, an exotic crew member hailing from a distant planet. The fate of young Vulcan Xon, a character originally slated for the syndicated *Star Trek* TV show planned last fall, is still in limbo.

The *Enterprise* itself will be given a slight facelift for its newest voyage because, according to Roddenberry, "We have to keep up with the technological advancements that have occurred since the show was cancelled in 1969."

Academy and Emmy Award winner Jerry (*The Man From Uncle, The Satan Bug, The Illustrated Man, The Omen* and *Planet Of The Apes*) Goldsmith will compose and conduct the music for the film. Elaborate special photographic effects will be provided by Robert Able & Lampusand Associates. Able will work in conjunction with Con Pederson and Richard Taylor in the creation of *Trek's* new visual whammies. Pederson was a special effects supervisor on Stanley Kubrick's *2001: A Space Odyssey*.

One of the most exciting aspects of the new *Trek*, for all concerned, is the appearance of Robert Wise on the set in the role of director. Wise, a four-time Academy Award winner and a recipient of the prestigious Irving G. Thalberg Award, has directed some of the finest films ever to emerge from Hollywood including *The Day The Earth Stood Still, The Andromeda Strain, The Haunting, The Body Snatchers* and *The Sound Of Music*. In Roddenberry's eyes, the man is "simply a genius."

"I met Robert Wise two years ago at the University of Arizona," he explains. "We were on a panel together. He had seen the *Star Trek* TV episodes and, so, after the scheduled lecture, we got together for a cup of coffee. By the time we had finished our talk, we shook hands on the idea that, one day, we just *had* to work together. We never thought it would be *Star Trek*."

After all those years of bureaucratic infighting, Roddenberry is delightfully surprised that the new Roddenberry-Wise team is coming together so smoothly. This is *one* film spectacle, he

Star Trek's cast, both old and new, attend the *Trek* press conference. Says producer Roddenberry: "This *will* be *Star Trek*. We have more time and money now, more of a chance to get into depth."

vows, that will *never* suffer because of ego battles between a producer and a director. "Robert Wise and I think totally alike," he says incredulously. "It's possible for one of us to make a decision when the other one isn't around and know that 97% of the time, we'll agree with each other. We feel the same way about things beyond *Star Trek*, too. Our ideas of what is moral and what our place in the Universe is are totally parallel.

Clearly, *Star Trek—The Motion Picture*, is going to be Paramount's BIG film for 1979. The movie will feature 70mm imagery and Dolby sound. There will be no cutting of corners and no compromises. And, Roddenberry assures the show's countless fans, there will be *no* eliminating the concepts put forth by the original TV series. "This will be *Star Trek*," he states flatly. "Not only am I determined to make it so—but so is Robert Wise. There will be some differences, of course, because this is a widescreen production. But the differences will be extrapolations of the original *Star Trek* concepts. We have more time and more money now, and more of a chance to get into depth.

Roddenberry pauses for a moment before reemphasizing the point. "I want everyone to know that we're not abandoning our original ideas. Just to show you how concerned Robert Wise is in preserving the original flavor, the time is coming when we have to figure out exactly how Spock is going to be used in the film. Robert has sat down and reviewed every Spock-oriented TV episode. He doesn't want to change Spock's character for the film, he wants to expand it, get *into* it more."

The desire to delve deeper into the world of *Star Trek* is affecting the script, at this point, as well. Based on an original story written by Roddenberry and Alan Dean Foster, the finished script was written by Gene and Harold Livingston. Dennis Lynton Clark is now completing work on a revision and polishing job. "What we're doing with the script right now," Roddenberry reveals, "is expanding the characters; showing their personalities more. We're going to know more about Vulcan. We're going to find out just what makes Kirk come back to his post on the *Enterprise*."

Although Roddenberry is sworn to secrecy on the actual plot of the film, he does admit that, as of now, "We're trying to develop the movie's inherent theme more. We want to evoke the feeling that Kubrick tried to get across in *2001*. We want to make audiences leave the theater thinking. 'Who are we? What are we? Where are we going as human beings in this Universe?"

Roddenberry leans back in his office chair and smiles contentedly. He knows the next few months will be hectic ones. A lot of work, a lot of revisions, a lot of overseeing will take place at his desk. But, after three years of fighting doggedly for this starship's very existence, the producer-captain of the mythical vessel can finally relax. On the new *Enterprise*, all systems are go at last.

In 1926, ambitious editor Hugo Gernsback launched a new genre of literature: "scientifiction." The first SF magazine, Amazing Stories, *was born and with it arose the heartiest race of magazines ever to hit newsstands . . . the science fiction pulps.*

By JOSEPH KAY

Here are a few scenes you aren't likely to see on TV this year, or find in a movie theater:

Deadly professional mercenaries fight elaborate mock battles for power and profit in the Corporate Wars. A fading writer's career is saved by a handpicked troop of gremlins.A strange saloon in the wilds of Long Island plays host to a group of patrons who offer tender, loving care to anyone who needs it, regardless of race, creed or dimension of origin.

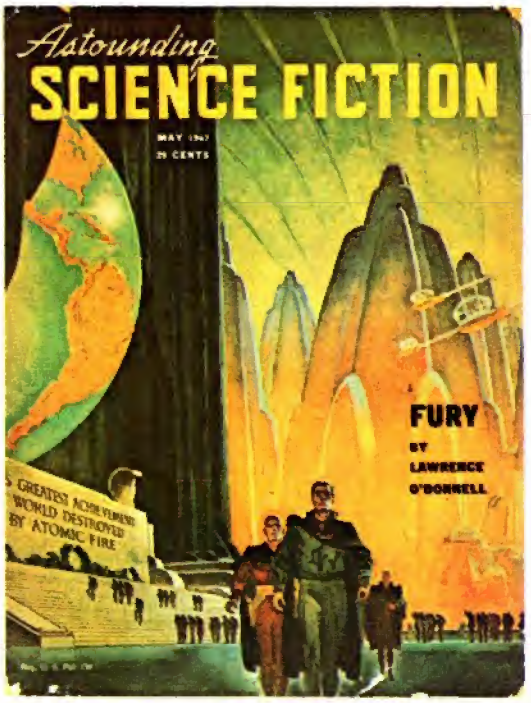
Strange ideas. Heavy ideas. Concepts so different, so vast in scope—or just too thoughtful for the mass media to cope with. Yet, these ideas are still alive and well and thriving in the science-fiction magazines.

SF magazines. The pulps: A unique breed of serendipitous wonder founded in 1926 by Hugo Gernsback, an ambitious editor who inadvertently *invented* SF literature! After dabbling with scientific predictions via such magazines as *Modern Electronics, Electrical Experimenter, Radio News,* and *Science And Invention,* Gernsback launched his concept of "scientifiction" in *Amazing Stories*. Not only was a genre of writing formally unveiled, but a hearty race of magazines dealing with that genre soon spread throughout the land from newsstand to newsstand.

Long-time fans of literary SF remember the pulps of old with fondness: those Flash Gordonesque relics of the thirties and forties with their wild covers promising slambang stories packed with dazzling action and adventure and brimming with pseudo-scientific gibberish. The pulps dubbed *Amazing* and *Astounding* featured such stalwart heroes as The Gray Lensman, Captain Future and Hawk Carse. They were the training ground and original market for Heinlein, Asimov, A.E. Van Vogt, Ray Bradbury, Ted Sturgeon, Harlan Ellison, Cyril Kornbluth, Damon Knight, Fred Pohl and virtually every writer that, today, might be called a giant .

Amazingly enough, the pulps managed to survive the changes brought about by the passing decades. Editors came and went, old pros waxed eloquent and new waves flourished within their pages. Today, the pulps still reign supreme, although they call themselves by different names: *Analog, Galaxy, The Magazine Of Fantasy And Science Fiction*. They've come a long way since the days of Captain Future, but they still enrapture millions by selling the same product as their predecessors: dreams as modern as tomorrow, as fantastic, as funny and as frightening as the limits of imagination.

Today, the premier SF magazine in the field is also one of the oldest. *Analog*, known as *Astounding* in the old days, has been in existence since 1930. In fact, only Gernsback's *Amazing* predates it. Under the editorship of F. Orlin Tremayne and the legendary John W. Campbell, *Astounding* revolutionized SF writing by insisting on *real* story



DREAMS FOR A DOLLAR AND A BIT

telling and *real* science. *Real Science*, sensible extrapolation and inference on known fact, was destined to replace the badly-managed theories of advanced gobbledygook which occasionally graced the pages of the pulps. (i.e. "Since feathers are light and birds can fly using feathers . . . if I build a ship out of feathers, it will fly like a bird.") Real storytelling buried forever those "it was only a dream, ha ha" plots with tons of intense characterization and logical story development. This blinding revolution first came into being in the early thirties, but its echoes still shape the field right down to the present.

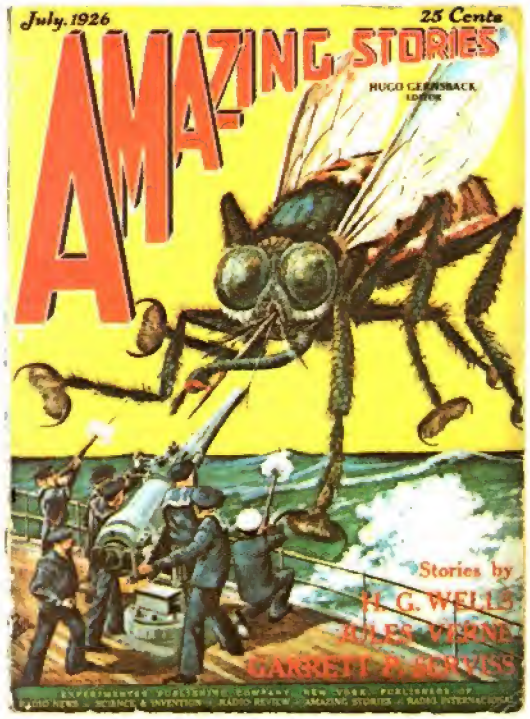
Today, *Analog* (rechristened in 1960), winner of five consecutive Hugo Awards, is still known as the undisputed champion of the "hard science" story. So much so, in fact, that it is referred to by readers and competitors alike as "the one with the rivets." Current editor Ben Bova, however, denies this allegation. "We're into electron-welding now," he quips. "Better aerodynamics."

Analog does present a lot of hard-science ideas but it also delves into people-stories as well. *Analog* is worried about how people cope with science in their lives. And cope they must to make it into the magazine's pages. "I'm looking for stories where our characters know what they're doing," Bova explains. "They may win or they may lose but at least they strive. I think that most of the time they *do* win, because if you look at the history of the human race, people succeed. We move ahead. We solve problems. Human beings may be problem-creating animals but they're also problem-*solving* animals. Our readers especially want to see powerful problems that are solved in novel ways. They believe in the scientific point of view, that Man's irrational mind can understand the Universe and that what we understand, we can adapt to our purposes."

And *Analog*'s diet for futuristic fodder is just the tip of the magazine iceberg. In 1978, the descendents of the pulps do quite well by their science-fiction fans— with different magazines taking different approaches. Here, at a glance, is the world of SF magazine-dom as it exists today.

GALAXY: If *Analog* is the publication that turned the SF field towards greater thoughts in hard-science, then *Galaxy* is the magazine that brought SF into sheer imagination's realm with equal gusto. Begun in 1950 as an outlet for some of the more satirical and blackly humorous SF scenarios of such authors as Kornbluth, Knight, Simak, Bester and Pohl, *Galaxy* quickly established itself as one of the most eclectic magazines of the SF genre—offering everything from telepathic criminology to advertising-agency world empires.

These days, *Galaxy* sways delightfully between classical hard-science writing and vivid science-fantasy with old pros and new faces writing side-by-side. This broad base of appeal is intentional because, according to editor John Pierce ". . . the line (between hard-science and



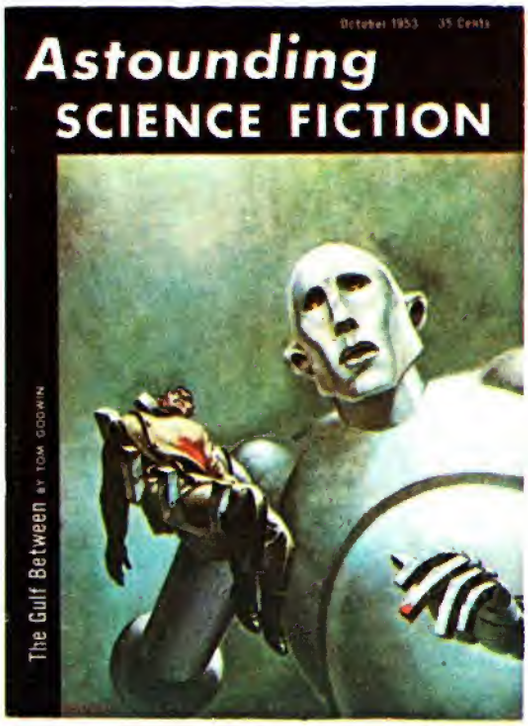
fantasy) is going to continue to dissolve. My tastes are pretty eclectic. I'm looking for basically good stories, hard-science or not."

THE MAGAZINE OF FANTASY & SCIENCE FICTION: Begun in 1949, F&SF had made a reputation for itself by presenting the finest of both science fiction and sheer fantasy. Right alongside Isaac Asimov's science-fact column will be a phantasmagoric excursion into never-neverland such as Harlan Ellison's "Working With The Little People." And while the elves do their thing, Ron Goulart continues his never-ending search for truth and justice in his futuristic "Barnum System," the same world-setting of the Goulart-Kana comic strip *Star Hawks*. The resulting magazine is a collage of the best of both worlds of SF literature.

GALILEO: Unlike most of its digest-sized competitors, *Galileo* makes a big impression on its readers by simply being *big*. Using a comparatively large 8½ by 11 inch format, this recent entry to the magazine sweepstakes demands attention with its wonderful covers and delightful mixed bag of SF stories, book and film reviews. Its most talked-about service feature, *The Aleph* contains a roster of forthcoming and current SF/fantasy books, listing title, author, publisher and capsule summary for each.

UNEARTH: Billed as "The Magazine of Science Fiction Discoveries," *Unearth* advances the realm of science-fiction literature to new and broader horizons by accepting *nothing* but material by *newcomers*. Their search for unpublished talents-on-the-rise has led SF author Ted Sturgeon to state that issue #3 is the "single best issue of any magazine in the field this year (1977)." Also onboard for the unearthly goings-on are Harlan Ellison (with a column

Begun in 1949, *The Magazine of Fantasy And Science Fiction,* always lives up to its name, presenting the best of both genres.



In 1927, Hugo Gernsback inadvertantly launched a new school of magazine publishing: the science fiction pulps. Today, over fifty years later, the pulps still thrive.

The covers are designed to express the 'flavor' of the text within. Over the years, they have gone from romanticized adventureism to highly sophisticated spaciness.

on writing), Hal Clement (with a science-fact feature) and several big names in the SF field presented in "The First Sale" section, a continuing feature reprinting major writers' first professional offerings.

ALGOL: Under veteran fan Andy Porter, *Algol* is the only magazine *ever* to make the big jump from fanzine to professional status. *Algol* is a magazine dedicated to SF literature, offering interviews with and articles about SF writers, fans and editors. Porter also offers features on the state of the field, new books and upcoming conventions for the discerning fan to scrutinize.

ISAAC ASIMOV'S SCIENCE FICTION MAGAZINE: If you're looking for no-nonsense science fiction, this new magazine is the answer. Founded a little over a year ago, *Asimov's SFM* presents hard-core science fiction the way it used to be written: crisp, clean, scientifically accurate and, on occasion, totally whimsical. The good doctor Asimov, who oversees the magazine and sets the general tone of the book, has been writing for four decades and simply will not accept anything that he doesn't consider to be high quality SF. Editor George Scithers admits that he leans towards solid conventional narrative and sound scientific extrapolation, but is not adverse to a few puns either. (And Asimov is probably the king of the outrageous SF one liner.) *Asimov's SFM* is the closest thing to good old-fashioned SF around today on a regular basis. Apparently, its readers are wild about its tried-and-true approach, too. Recently it increased its publishing schedule from a quarterly to a bi-monthly basis.

And so, the science-fiction magazines march onward. Occasionally overshadowed by the widescreen SF swashbuckler and the gaudy covers of the professional monster magazines, the modern-day children of Gernsback's "scientifiction" doggedly continue to print the most imaginative and thought-provoking elements of wonder available. While the nation basks in the glory of *Close Encounters* Disneymania and *Star Wars* saturation, the science-fiction magazines quietly present the finest of established storytellers and introduce the next Asimovs and Bradburys to a small coven of loyal readers.

All this magic, all this wonderment is there for anyone to enjoy. There on the local newsstand rack, sitting innocuously beside *Esquire* and *Cosmopolitan*, the steadfast SF magazines confidently await their next reader, offering something that no other publication can equal... dreams for a dollar and a bit.

Civilization in Space:
The Possible Dream

CHAPTER FOUR
The Great Rama Escapades and Centennial Celebration of the Arts

From the Earth they came, from the Moon, the asteroids and neighboring habitats . . . they came in all manner of craft and costume to observe and partake in the Centennial Celebration.

Civilization in Space: The Possible Dream

The Great Rama Escapades and Centennial Celebration of the Arts

This series is based upon the most recent findings of scientists and engineers who propose space colonization utilizing the materials and technologies presently available. The purpose of these dramatizations is to explore the commercial endeavors, political structures, opportunities for experimentation and exploration, and the quality of daily life available to the 10,000 hypothetical inhabitants of a realistic, totally artificial new world in space . . .

By DAVID HOUSTON

Ramans—still spiritually high from recently marking the centennial anniversary of human life in space—prepared for work as usual on the morning of November 3. Most citizens of the inside-out world at L5 were finishing their fresh eggs, just-squeezed orange juice, and reconstituted vegetable protein—when the 8:15 edition of *The New York Times* began to hum through their receiver/printers. The news, while not dull, was mainly of concern to Earth; but there was one columnist, George Bashman, whose words were to engender indignant conversation at Rama for some time to come. Bashman quipped, in passing:

"Much as we admire their fortitude and frontier spirit, we must observe that the pioneers of Earth's longest-established space habitat are uncultured and unrefined. Call them spacebillies."

On November 14, Ramans who happened to be watching saw an embarrassed Hal Carlson on the Sissy Pardeau show, telecast from Los Angeles (Hal was an engineer from Rama visiting Earth on business). "But surely," Sissy droned, frowning and smiling at the same time, "you must miss the mountains, the waterfalls, the changes in climate, the wide-open spaces. What do you *feel*, Hal, when you see a landscape by Balini?" Hal replied: "He's a painter? I'm not familiar with his work." And there was a horrible chuckle from the thousand strong 3V studio audience.

Instantaneous telecommunications saw to it that Rama had become a laughing stock among the artistic elite of Earth—within the short period of a month following Bashman's initial insult. Within two months, even the most uncouth of Earthmen—hoisting beers at dives near spaceport docks—laughed inanely about the spacebillies:

"D'ya know how many Ramans it takes to hang a painting?"

"How many?"

"Thirty-two. One to tie the noose, one to slap the horse—"

"That leaves thirty—"

"They're the posse."

* * *

The Rama Cultural Exchange Committee consisted largely of semi-retired elder citizens and younger would-be artists. For nearly thirty years, the Committee had contented itself with arranging for the importation of dramatic productions, music festivals, and prize-winning documentary programs—all of them microwaved from Earth for re-showing at Rama's several public theaters and meeting halls. Museum exhibits of painting and sculpture were gathered from time to time, too; but these seldom proved popular since even three-dimensional imagery was not "the real thing."

On January 20, the first "emergency meeting" in that respected Committee's history was called. It was a beautiful, clear, warm day (because every day at Rama was like that). Earth—visible through the alpha slot in the Rama cylinder—was full and white. It gave arriving committee members particular pleasure to look at it and recall that Sissy Pardeau was being rained on in Los Angeles and George Bashman was enduring a blizzard in New York.

Mirrors partially reflecting the Sun made it early evening. The temperature (on schedule) was dropping a notch or two, and a gentle breeze was resulting. The Committee met this time on the terrace at Liz Roycroft's apartment. Her son Tommy was serving refreshments and eavesdropping.

"We're damned if we do and damned if we don't," ventured Buck Langley who, at 113, was the oldest member of the Committee and one of the 50 oldest citizens of Rama.

"If we're damned anyway, let's *do*," suggested Marsha Main—who taught music at Rama High, and whose husband ran the General Store on the beta strip.

"Can we agree on this much, that we will in some way answer, challenge, deny, or discredit the idea that we are soulless mechanics with no regard for the alleged finer things in life?" The questioner was chairperson Win Spears, an agricultural specialist. She noted with approval the unanimous nodding of heads. "Now, how do we do it? Invite our critics up to see for themselves?"

"Hell no," Buck Langley growled. "I wouldn't contribute a red cent to pay for their transportation."

"Besides," Liz interjected, "it's not the critics we need to convince, it's those who *listen* to the critics. I wouldn't mind setting up a permanent ban prohibiting the likes of George Bashman from ever setting foot here!" As science librarian at the University, Liz had no particular political clout, so Committee members heard the spirit of her remark, not the letter of it.

"How about starting rumors that fight fire with fire," suggested stress engineer Sylvia Cason. "Accuse them of having no technological common sense. Have you heard how many Earthmen it takes to change a light bulb? Five. One to hold the bulb and four to turn the ladder."

"Negative," Win said, not amused. "A demonstration is called for, but how can we keep it from seeming to be a defensive move on our part? The Earthbound slobs are entitled to their odious opinions, after all."

"We'll need the approval of the

The preceding double-page spread: A wide variety of small craft make their way to Rama to help celebrate the Centennial. At the bottom right one of Rama's huge mirror-panels reflects the Earth floating in space.

Rama Council; we'd better keep that in mind," Liz cautioned.

On and on the meeting progressed. The great mirrors let the image of the Sun fall off their edges, and night fell with the rapidity of an eclipse, as usual, and a nearly-full Moon lent Rama the same cool light it was delivering to the Earth.

A light supper of cold chicken and raw-vegetable salad was being consumed when Tommy opened the door to admit Anson Hayes. Anson was still, technically, a visitor to Rama, though he had applied for residency in order to link himself through marital responsibility to the widow Liz Roycroft and her eight-year-old son. This meant Anson's abandoning his Earthly position of fame and fortune as a global presence on 3V; but already it was proving to be no sacrifice. He had been offered a top position in the Space Habitats Communications Studios, which included a columnists' link-up with Earthwide 3V systems.

"What do we do with Bashman?" Anson asked, helping himself to the goodies on the buffet. "Fry him with a beam of microwaves?" His chuckle betrayed his inability to take the matter very seriously.

"Whose side are you on, Earthman?" Liz chided. Then she realized: "You *know* the bastard, don't you? Is Bashman a friend of yours?"

Anson nodded. "Roommates at Columbia, apprentices at the *Times*, occasional drinking buddies in recent years. Have you looked at this from his point of view, poor fellow? Desperate for a touch of humor—as all columnists become from time to time, on tired days—he slipped in a tiny indiscrete observation, and—"

Liz took his plate and scraped its contents back into the serving bowls. "I recommend the Hilton Coffee Shop," she said with a poisonous smile. "They say the food there is dry and sterile—reconstituted mush."

On his way to the Hilton, situated in the "south" hub of the habitat, Anson stopped in one of Rama's lovely parks, draped his lanky form over a bench, and extracted a portable from his pocket. He punched in his credit code and a request for human assistance.

"Rama switchboard," a young male voice answered. Probably a student on part-time duty.

"What time is it in New York?" Anson asked.

The operator answered. "18:55. Would you like me to place a call?"

"See if you can track down George Bashman, would you? I'll give you numbers for his home, office and club. I don't have his portable number, he keeps it unlisted, but maybe his wife or a secretary will give it to you if you say it's Anson Hayes calling from Rama."

* * *

"We're damned if we do and damned if we don't . . . "

The following morning, it fell to Anson himself to announce via Inter-Habitat-3V that, "Rama's cultural guardians will hold a Festival of the Arts during the week that closes our Centennial Year. In the four months between now and then, the Committee will be auditioning and selecting local talent to be represented—and purchasing what they call an exceptional program of events from Earth. Those wishing to participate or contribute time or money should contact Liz Roycroft or Buck Langley in care of this station's Community Bulletin Board." Unfortunately, Anson was not totally successful in supressing an undertone of private amusement.

"I love you, Anson," Liz said to him later that day, "but get out! I'm so mad at you that I can't concentrate on really important things with you hanging around. I recommend the Hilton. I hear their rooms are cramped, poorly ventilated, and a real horror to navigate in the light gravity."

"I spoke to Bashman last night, Liz, and I—"

"Maybe you should just pack up and go back to Earth. I hear it's crowded, polluted, unpredictable and dangerous!"

* * *

Three weeks later, Anson announced the first exhibits and events to be included in the Festival. He did it utterly deadpan trying to betray neither derision nor enthusiasm. (The Hilton was perfectly comfortable now that Anson had mastered the differing gravities; but it wasn't comfort he missed.)

". . . prize-winning paintings by the hobbiests at the College of Particle Physics, and an array of light-gravity mobiles constructed by the High School art club. In addition, there will be an exhibition of stunt flying by seven of our most accomplished winged-and-weightless pilots, in gliders chosen for the decorative art on their wings and leg straps. Buck Langley will show his collection of framed and mounted space debris dating from before the turn of the century; Rama designer Grace Silverberg will show her new line of work and leisure one-piece garments; and Marsha Main will offer a new musical composition played on her miniature electronic Steinway keyboard. The first in a series of concerts sent up from Earth will be a program of music with outer space themes played especially in honor of Rama's Centennial by the Vienna Philharmonic. Other events will be announced as soon as plans are firm."

Neither Anson nor anyone else failed to note the humbling gulf between Rama's contributions and the Vienna Philharmonic—decidely a victory for the "old world."

Agitated, Anson made arrangements to meet Geoffrey Merrick for lunch. Elder statesman Merrick had been somewhat responsible for the would-be mating of Anson and Liz. So surely, Anson thought, I can unburden myself on Granddad Merrick's shoulder — which ought to be broad enough to bear the weight of the cultural and romantic problems disrupting my life!

They met at an Indian restaurant in the mall of the Apollo—the business center of the delta strip. The small restaurant was owned and operated by Akbar Patel, the son of the first-generation electronics instrumentation designer. Vegetable curries were the popular main courses, and home-made breads—made roughly as they had been being made in India for a thousand years—were the piece de resistance.

Akbar himself served the two local

celebrities—starting them with icy goblets of El-5000, Merrick's own patented (and lucrative) soft drink. Geoffrey and Anson dined in the open (most public places were "sidewalk cafe" types, unless privacy or acoustics were involved), and during their friendly talk, Anson's eyes darted irresistibly to the orchards of the delta strip, visible just beyond the downtown buildings, and up to the distant and quiet communities of the alpha and beta strips which were plastered centrifugally (magically, Anson still felt) over his head.

"The festival thing is silly to me," Anson confessed, waving his hand to call Merrick's attention to the whole of Rama. "*This* is the real work of art—Rama itself. I've never seen or heard of a work of art that so thoroughly makes me feel that life is purposeful, happy, eternal. Who cares if you people haven't turned out a Beethoven or a Michelangelo?"

Akbar bent low. "Mulligatawny soup, gentlemen, and bajhia."

Anson continued: "How many artists emerge from the mills of Pittsburgh, or the auto factories of Detroit, anyway? Rama's an industrial community, not an artists' colony."

Merrick simply smiled. "I have three ideas, Anson. One. Contact Richard Pilgrim; I think he lives in Chicago. He's a prominent artist down there—"

"I know. I interviewed him when he was doing a mural for the new Illinois capitol building."

"He was born here at Rama."

"You're kidding!"

"Rama, you see, is not the best place, as yet, for an artist to establish his reputation. The work for a painter is on Earth. Richard left here after high school, but he's certainly a cultural son of Rama. Let's see if we can get Richard to express pride in his heritage with some kind of contribution. Two. We have a unique situation here, in the performing arts. Have you seen the big show at the Hilton, Anson?"

"I haven't been able to get tickets."

"It includes a one-act play by a native Raman. I'm dead sure Liz won't think of him, or his play, because it's terribly commercial and a little on the risque side. But it's very funny—an old style French farce with mistaken identities and people hiding behind all those bedroom doors. You've heard about the theater?"

"It's an elevator."

"It rises gradually toward the hub, with its audience of 300, until it becomes weightless. The play, constructed so that the final scenes are played without gravity, is a frenzy of floating, zooming and chasing bodies—a few of them stark naked, but perhaps we can fix that. And it's very entertaining, a damn good play which nobody has been taking seriously. Let's make them take it seriously. It's easily the most professional theatrical venture Rama has ever originated—even though it's just popcorn for vacationers and honeymooners from Earth.

"And there's another possibility involving weightlessness: ballet. The Hilton theater could also be used for a really graceful and breathtaking dance—utilizing our own handful of students and a couple of professionals shipped up from Earth. But we'd better get the stars up here soon, so they'll have time to get used to the nutty environment.

"And point three. Some of our older and semi-retired citizens have done some really nice arty things—like Bill Shaeffer, who does etching on thin aluminum plates which have to be exposed to the vacuum of space. Liz will probably run across his work, but she might not realize how newsworthy and unique it is. *You* might consider doing a special piece on him for syndication—for the edification of our Earthly detractors."

"What time is it in NY?"

Curry and poorie arrived and steamed deliciously.

"Okay Geoffrey, what's idea number four? How do I get Liz to simmer down and remember how much she needs me?"

"I think ideas one through three ought to hold the answer to that. Liz has a . . . call it a dynamic streak of self-righteousness. I don't think there's anything either of us could say to her, but perhaps you can *show* her you're on her side."

"I suppose I am on her side, but I'm afraid she's fighting a losing battle."

"Really? I don't see how she can lose. Have some chutney?"

* * *

Three days before the week-long festival was to begin, *Times* columnist George Bashman arrived at Rama. The announcement of his disembarkation spread through Rama almost as quickly as if it had been bellowed from the docking hub by some hysterical giant.

Liz groaned, Buck cursed, Marsha Main uttered her first public obscenity ("Marsha!" Liz gasped, truly startled); and they and the rest of the committee tried (unsuccessfully) to persuade the Council to detain him there at the dock for a fortnight. Anson smiled, a trifle wearily, and conducted his old college chum through connecting corridors to the nearby Hilton.

"How on Earth did Bashman get an accommodation at the hotel?" Liz demanded of Geoffrey Merrick via portable. "They've been booked solid for two months!"

"He's had his reservation since the day the Festival was first announced. Anson made it for him."

Liz punched the disconnect button without even telling her dear friend goodbye. She wasn't mad at Geoffrey, just speechless.

With Anson flanking one side of the door, a bellhop flanking the other, George Bashman was ushered rather dramatically into his hotel room. "The finest room on the highest-g floor, G.R.," Anson said, using Bashman's college nickname. "I trust you'll feel right at home."

"Antsy, my boy, there's not a hope in hell that I'll feel right at home. I already feel as though I'm off to see the Wizard. And there's Oz." He gestured toward the inner cylinder of Rama, much of which was awesomely displayed beyond the open drapes at the end of his room. "You can't point to two things out there that are *real!*" He hurried to the railing of his terrace. Incongruously, people below his terrace, at the Ramaside entrance to the Hilton, were taping up red-white-and-blue bunting—just as if they were back home in Kansas. While Bashman stood thus transfixed, night fell. Fast.

"Glad you came, G.R.?"

"Asked the doctor of his hallucinating patient. I've seen the pictures, and I've read the books, but I was *not* ready for this. You know, Anson, I never travel for pleasure. I always wait until work sends me to some exotic locale. I was afraid I would never *need* to travel to space, to visit the habitats; and so I would never do it. I can thank Anson Hayes for giving me the excuse I needed. Come to think of it, they can put that on my grave marker—after I die from acute disorientation."

"Unpack and freshen up, G.R. You'll be on your own during the Festival, but for the next couple of days, I want to show you around. And the crew at our local radio and 3V station wants to wine and dine you tonight.

You'll find some of our flimsy native garb in one of those drawers, so you can be comfortable and a little more incognito."

Two days before the festival, word spread that Earth ballerina Nina Kanova had been rushed to the hospital (not seriously injured) after making a *grand jete* into the ceiling during rehearsal. Presumably she was greeted at the clinic by Marsha Main—who had been admitted only hours earlier for treatment for exhaustion; she had passed out following a 72-hour stint attempting to complete her long-awaited string quartet in time for its premiere at the Festival. Liz announced that a Grieg quartet would be played instead. The letters for the great banner arrived from the fabric plant. An "A" was missing.

The night before the Festival, an aluminum bracket—specially fabricated to anchor the central line for the banner—broke. It could not be replaced in time, so Buck Langley robbed one of his glass cases and substituted a steel bracket that once had been part of the docking ring of Skylab II.

George Bashman was troubled that night by ill-defined feelings and, at 4 a.m., he tapped lightly at Anson's door hoping his friend might also be awake.

"Come in, G.R.," Anson called from within.

Bashman found him sitting on his terrace tipped back in a lounge chair. "G.R." made himself comfortable in a similar appliance.

The night was Moonless, unusually dark, and from out there somewhere came occasional barely-audible shouts, occasional strains of music, and in the air—arrayed roughly along the central axis—there were slowly moving lights which, on Earth, Bashman would have given no thought to: they would have been aircraft. The mid-strip communities of Apollo, Gemini and Mercury were partially aglow and looked like globular star clusters.

"Are there night shifts at the factories and labs?" Bashman asked. "Or should I assume that all that activity is directed toward the Festival?"

"Festival, mostly, I think."

After a moment of thought, Bashman ventured: "I had no idea this thing was absorbing the whole colony. I thought an enthusiastic arts committee . . ." He added, when Anson had made no comment, "I'm not sure all this concern for what others think of them is healthy. You're new to Rama yourself, Anson, how do you feel about it?"

"My attitude has changed quite a bit in the past months; I used to feel pretty much as you do—but not any more. I love it. I'm awed by these people. Remember, G.R., this is not Earth."

While Anson spoke, something eclipsed Gemini. The little town went dark—as if a heavy cloud had moved over it. Bashman gasped.

Anson laughed. "Get some sleep; you'll have a busy day tomorrow. Besides, I don't think you're supposed to be seeing this. I suspect it's a dress rehearsal."

When he awoke, George Bashman—hardened critic, cynical humorist, defender of Earth's supremacy—ran to his terrace and looked outward with all the eagerness of a kid checking to see if Santa had come. There was nothing hanging in the sky. Anson called to tell him to join the media party at Apollo where, Liz had suggested, the best view could be obtained. (Liz and Anson were back on speaking terms, but there had as yet been no time for a reunion.)

The Festival began at 10—just before an official brunch—with blasts from recorded herald trumpets playing Copland's famous "Fanfare for the Common Man." Bashman's eyes followed everyone else's expectant gazes toward the hub opposite the dock and hotel.

Finally he made out some black dots and, his Earthbound subconscious supplying answers, Bashman assumed that an aviary had been opened and a flock of doves released. No . . . they were *people* . . . with brightly colored wings . . . circling, spiraling outward, soaring, around and around . . .

"When they travel in the direction the air is moving," Anson explained to him, "their weight increases and they move toward the ground. When they move against the wind, they not only experience aerodynamic lift, they become lighter in apparent weight. For forward propulsion they are using tiny jets for this occasion; normally for sport they'd merely flap their wings and swim through the air."

The fliers traveled in formation as they approached and then passed the crowd of observers. Grasping hands, they formed an eight-bladed propeller, off the ends of which fluttered red-white-and-blue streamers. They moved close together, rushed forward, and burst outward making a morning glory blossom that brought cheers from the thousands watching. George heard an echo . . . or was that a cheer from another of the communities? The fliers were nearly overhead before George noticed that a long tail of some sort was being strung out behind them. There were irregularities in the tail . . . letters . . . words . . . It said: "THE GREAT RAMA ESCAPADES AND CENTENNIAL FESTIVAL OF THE ARTS"—and it was more than two kilometers long!

"They were people . . . with brightly colored wings . . ."

Each letter dangled a "kite tail" of some colorful material. It was explaining to George that these were necessary "drags" to dip into the rotating air and keep the letters taut and all hanging in the same direction. Since the more central air moved slower than air nearer the surface, the sign seemed gradually to turn and present its face to first one community and then another.

Because his critical faculty was second nature to him, George noticed that the A in "AND" was a trifle too small and perhaps a little too pale, but still he was appalled by the behavior of several reporters (arrived just that morning) standing near him: they were chuckling derisively, amused by what they thought to be ineptness. Then Bashman was shocked by his own attitude: in just three short days he had

become an apologist for the colony! Something unexpected was happening to him! Was he being altered, mutated by cosmic rays or something? Into what?!

This bizarre idea stayed with him throughout the seven days of the Festival. It underlay his thinking and colored his perceptions. As he was preparing to depart, it—he assumed—was the cause of the tears that kept welling up in his eyes. Oddly, these were not precisely tears of sadness.

He stepped aboard the spaceliner *Armstrong* a confused but euphoric man. Within minutes of his departure (watching the habitat diminish on the 3V screen in his compartment) he could scarcely remember saying goodbye to Anson, Liz, Tommy, Buck, Marsha, and Geoffrey at the terminal. His mind was racing. He had already begun to write his column, which, he knew, he somehow had to finish before he again set foot on Earth.

George Bashman's column on the Rama Festival was one of the last to appear. Other news services had explored it amply, generally favorably (if condescendingly), and for a while it seemed that Bashman might not ever deign to comment.

Anson and Liz awoke to see a copy of Bashman's column—which someone had mysteriously slipped under their door—tumbling idly through the air. Their bare arms linked, they floated with it. Light coming through the small ports of their honeymoon suite at the Hilton shifted across the page as they read . . .

"So that you, dear reader, will not suspect that you are reading the wrong column, we must begin with some typical Bashman animadversion. We feel obliged to reveal to you that the Rama Festival of the Arts was riddled with imperfections.

"The high school art exhibit showed signs of immaturity. Buck Langley's fascinating space debris was not by any stretch art at all. The same might be said of all the other exhibits of crafts and hobbies. Poor Nina Kanova was not at her best (though she was exquisitely beautiful) doing pirouettes four feet off the floor with faintly evident bandages on her left arm. The great Rama banner had an imperfect A. And the Rama string quartet was no better than your average faculty ensemble at any college on Earth. There was more, but why be unkind?

"To dredge up a few positive notes: Robert Cole's 'Oops,' at the Hilton theater was such a clever farce that I recommended he adapt it for Earth performances; and native Raman Richard Pilgrim painted one of the finest murals in his distinguished career in the lobby of the Hilton.

"So much for the Festival. Now on to the context within which it transpired. I am about to delve into matters about which I know next to nothing; and if my loyal readers will forgive the ensuing burst of seriousness, I swear I'll never do it again.

"It seems plain enough that 'natural selection'—as a force in the evolution of Man—lost all its dynamism when our species developed generosity. 'Survival of the fittest' has been a meaningless phrase, applied to Man, for centuries. If anything, it has been the fittest who have had the worst time of it, hobbled as they have been by political oppressions; and it has been the least fit who typically have been protected and nourished.

"No longer. As I see it, with the advent of space colonization, humankind has again begun to evolve, to perfect itself.

"It's a cliche that Rama is like a small New England town of the early 20th Century. I myself fell for this notion, and it in part led to my maligning the Ramans through my silly remark that fostered the current anti-Raman attitudes among the bigots of the Earth. That I was wrong, that my remark was unjust, was clear to me within the first hours of my visit to the habitat. Consider:

"There are only three ways to become a Raman—through money, expertise, or birth.

"While wealth *per se* is no proof of virtue, it means something when it is spent to secure citizenship in a place where hard work is the ruling principle, where technological creativity is the highest prize, and where life is prolonged to an average length of 110 (largely due, I'm told, to the lightening of the burden of the heart in the available lighter gravity).

"Most first-generation Ramans were hired from Earth for their superior science and engineering talents—which often means they possess a well developed facility with logic. Typically, as on Earth, such people enjoy a higher-than-average level of self-esteem and a rather joyous capacity for self-sufficiency.

"The children born here, of such parents and in such an environment, tend to perpetuate the type.

"Without exception, the Ramans I met were happy, industrious, honest, generous and just. In their 100-year history, there has been no crime (well, three or four crimes of passion, but nothing premeditated) and no poverty. I attribute this largely to the fact that at Rama survival is such an *evident* value, and honesty (seeing and representing things as they really are) can be a matter of life and death. The same is true on Earth, of course, but at Rama there are no dark corners. The whole of their world can be seen in a single sweep of one's dazzled eyes. Rama itself serves as a survival-ethics whetstone.

"I wondered at first why Ramans were so sensitive to the relatively minor accusation that they were 'spacebillies.' I wondered what was happening to *me*, why I seemed to be reverting to childhood. I wondered why I could be so delighted by amateur art and a bizarre collection of space junk, why the Vienna Philharmonic sounded so good even though I was experiencing only a broadcast image of it, and why I thought of the Vienna Philharmonic as a *Raman* accomplishment, of all things!

"It was all because Ramans, I have come to believe, are a new breed of Man. People developed along the lines of only the best the human race has had to offer. They are Wells' starbegotten, Clarke's star children, Rand's Atlanteans, Morow's link to the universal soul. And it has happened not through any intervention by a superior race, but through strivings of our own.

"They are sensitive to injustice because they are used to fair play. I felt like a child there because it was the world I though I'd grow up to live in—but didn't. Their modest artistic efforts thrilled me because they were honest accomplishments (not a negative subject among them, incidentally) offered simply for what they were. The Philharmonic *was* an accomplishment of Rama—in that Ramans have come to represent to me all that is beautiful and worthwhile in the human spirit, the same spirit that makes music on Earth.

"Spacebillies? Hardly. Ramans are . . . tomorrow."

Anson tossed the paper jubilantly and with a laugh. Liz floated away pensively.

"*Now* what's the matter?" Anson demanded.

"Maybe we're wrong to take Bashman seriously enough to think he deserved an answer from us. Maybe the Festival was pointless. He's clearly out of his mind! We're just people, Anson, and that's all we want to be." Suddenly she grinned. "But it *is* better to be a superman than a spacebilly."

"Let's dress and go down to the Tenth-G for brunch, Sweetheart." Anson said swimming toward the handgrips on the wall. "I want to see all those Ramans with swelled heads."

NEXT ISSUE:

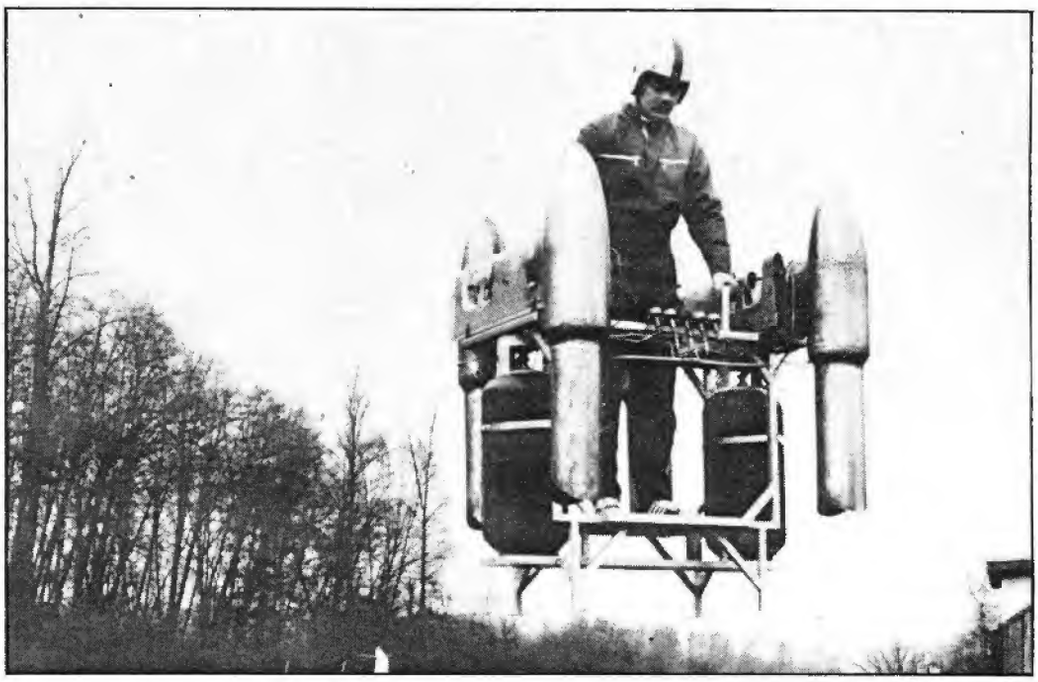
Chapter 5—

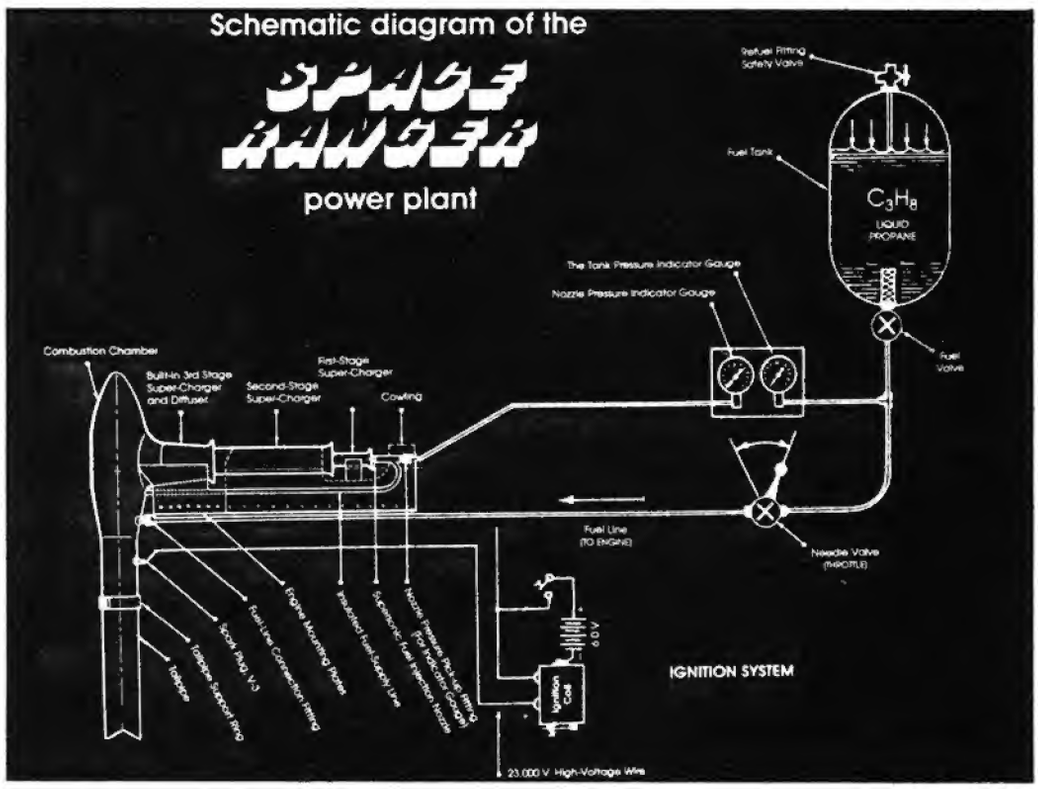
"Freeman's Rebellion"

hardware

Some of the latest gadgets and innovations from inventors and manufacturers

Space Ranger
by Space Ranger Corp. Jet-powered Flying Platform. Suggested retail price: $5,795.00 (kit).





Schematic diagram of the SPACE RANGER power plant

Mr. Timewell reports that he has been working on the craft for the last 2½ years in the basement of his home. He has tested the craft in isolated areas and believes that it is now ready for marketing. He hopes to be able to diminish the noise level and extend the range of the vehicle in later models.

Mr. Timewell offers the Space Ranger as a kit for $5,795.00, or a complete set of blueprints and construction plans for $97.50. Information packages are available for $7.95.

The maximum load, including pilot and cargo is 270 pounds. Fully fueled and ready for take-off the Space Ranger weights just 250 pounds. The four jet engines produce 130 pounds of thrust each. The Space Ranger has only one control, the throttle. On take-off, the throttle is gently increased to the desired lift speed. To descend, the reverse is applied. Steering is achieved by leaning in the direction you wish to travel, for example, lean forward for forward motion . . . sideways for side motion, etc.

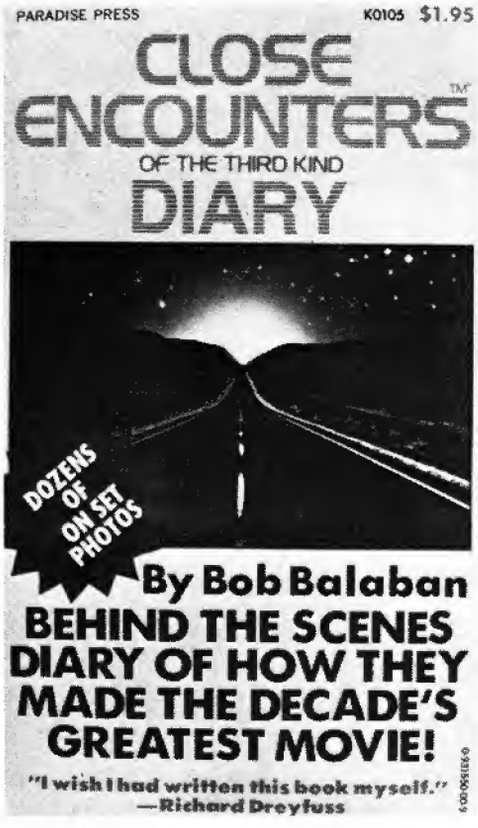
The vehicle has five gauges, one for each of the four engines to indicate thrust, plus a fifth gauge to indicate fuel pressure.

Mr. Timewell cautions buyers that the Space Ranger is a "kit" craft, F.A.A. regulations require inspection at each stage of construction. This means that the Space Ranger is unable to have F.A.A. certification until the craft is completely assembled by the individual builder. The corporation is in process of applying for F.A.A. certification as a home built craft. Also as heliarc welding is used in the assembly of the vehicle, knowledge of welding techniques for aluminum and stainless steel is necessary.

The inventor has received a number of suggestions for modifications and safety features including a circular platform with a perspex or plastic bubble to protect the pilot from the elements and flashing lights to warn other aircraft. "I am presently corresponding with a company that manufactures parachutes which explode open using a shot gun shell. This parachute could work at a height of less than 30 feet, and would greatly increase the safety of the vehicle."

Interested persons should contact Mr. Richard Timewell at Space Ranger Corporation, 119 Terminal Building, King County International Airport, Boeing Field, Seattle, Washington 98108.

Inventors and manufacturers are invited to submit items for inclusion in this column. Please forward all information to David Hutchison, Science Editor, FUTURE, 475 Park Ave. S., 8th floor, NY, NY 10016.



Close Encounters of the Third Kind Diary
By Bob Balaban. ($1.95 in paperback from Paradise Press.)

If you ever wanted to know how a movie was made—specifically one of the greatest science-fiction movies of the last decade, this is what you have been waiting for. Bob Balaban, a notable New York actor whose credits include *Catch-22,* and Francois Trauffaut's translator in *Close Encounters,* has written an affable, informative, and precise volume concerning his every day on the film set.

Among the tasty nuggets of information he imparts about CE3K are foggy gasmasks, faulty on-screen French, an Independance Day death threat against Richard Dreyfuss, almost a dozen unused sequences, and disco-hustling extraterrestrials. From March 24, 1976 to October 30, 1977, Balaban chronicles the ups, downs, side-ways, and all arounds of a multi-million dollar production and its intense, crazy, overworked, and sometimes hysterical participants.

Thankfully Balaban himself comes off as the nicest of fellows—not at all the way you'd expect a "big time movie star" to be. His thoughts, worries, successes and failures might match almost any "normal Joe" on the street, until the reader feels almost a part of the actual CE3K experience. The book is further helped along with an introduction by Steven Spielberg, a review quote by Dreyfuss and the acknowledged good wishes of Melinda Dillon, Teri Garr, editor Michael Kahn, production designer Joe Alves, Dr. J. Allen Hynek, and many others.

The only bug in the literary work is the slap-dash packaging job perpetrated by Paradise Press. The over-all sloppiness of the printing and sorry reproduction of the many on-set photos does much to dimish the selling power of the book, but the reader is saved by Balaban's humble humanity and tight prose.

—Richard Meyers

Dreamsnake
By Vonda N. McIntyre ($8.95 in hardcover from Houghton Mifflin)

Nebula Award-winning novelist Vonda N. McIntyre wields as much magical power as her heroine, Snake, in *Dreamsnake*—one of the finest examples of SF adventure to come along this decade. Snake is a healer; a doctor of medicine in a post-holocaust world where reptiles are used as the perfect panacea. Armed only with a cobra, a rattler and an alien creature known as a dreamsnake, the healer travels throughout the land—practicing medicine on patients too superstitious or awed to appreciate her talents. After the death of her rare dreamsnake, young Snake must begin a dangerous odyssey in an attempt to both find a replacement and save her reputation as a true healer.

McIntyre envisions a journey that wanders not only across an alien landscape, but through a complex world of human emotion as well. Snake's plight is a simple one, yet one both hauntingly captivating and inherently terrifying. As brought to life by McIntyre, Snake and her surroundings offer everything an avid reader of any genre of fiction could hope for: tenderness, high adventure, humor and pathos. In short, *Dreamsnake* is SF storytelling at its best.

—Ed Naha

The Illustrated Roger Zelazny
Illustrated by Gray Morrow, edited and adapted by Byron Preiss. ($8.95 in outsized paperback from Baronet Publishing Co.)

This is an excellent venture into a field that is just starting to get wide public exposure: full-color, graphically illustrated science fiction. Gray Morrow is an old hand at drawing science-fiction comics and is one of the field's best 'story-telling' artists. The four Zelazny stories brought to life in this volume are "The Doors Of His Face, The Lamps Of His Mouth," "A Rose For Ecclesiastes," "The Furies," and a new chapter in Zelazny's *Amber* mythos written expressly for this book, "Shadowjack." In addition, there are two Morrow montages that really capture the spirit and flavor of Zelazny's books and continuing characters.

The stories are excellently adapted by editor Byron Preiss, who has used the original text whenever possible.

—Howard Zimmerman

video images

Science fiction & fact on television

Edited by ED NAHA

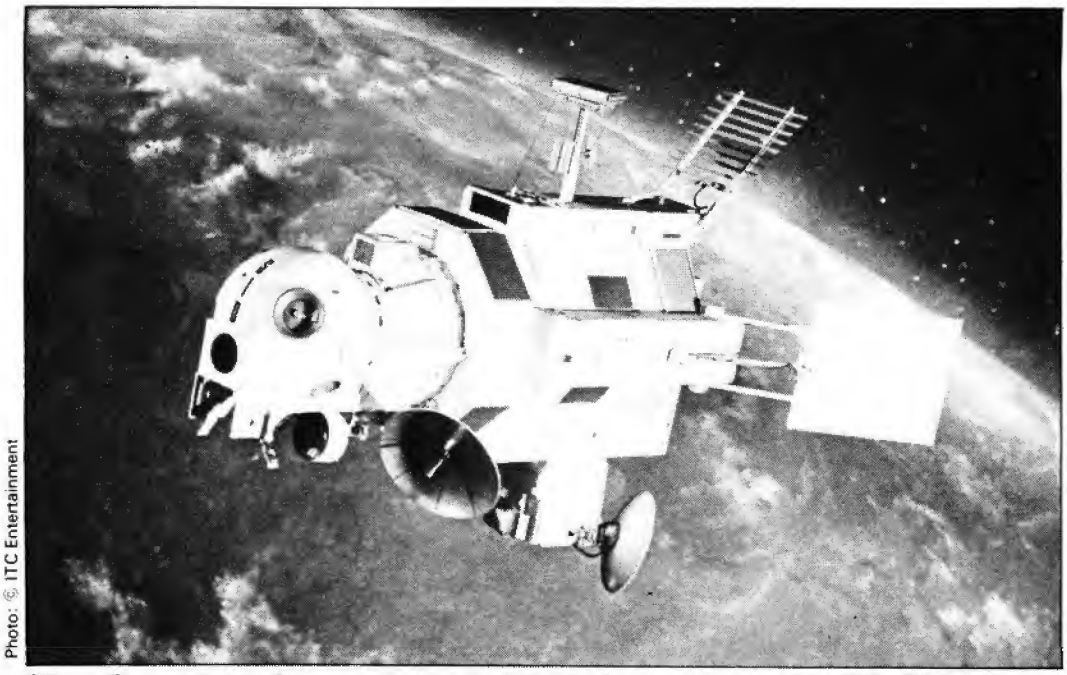


Photo: © ITC Entertainment

SID—a Space Intruder Detector—is described as "the last word in computers" by SHADO. Both SID and SHADO are part of Gerry Anderson's *UFO*, a resurrected SF production.

While the major networks attempt to bolster ratings by rescheduling both first-run science-fiction shows and made-for-TV SF telefilms, many local TV stations are jumping into the current SF-fantasy popularity wave by flaunting their seemingly endless supply of syndicated SF shows of yesteryear. As CBS, ABC and NBC hurriedly ready such future offerings as *Flash Gordon, Buck Rogers, Battle Star "Galactica,"* and *Dr. Strange*, smaller broadcasting outfits from coast to coast are resurrecting such vintage fare as *Science Fiction Theater, The Twilight Zone, The Outer Limits, Voyage To The Bottom Of The Sea, One Step Beyond* and, of course, the original *Star Trek*. One of the newest reentries into the syndication race for ratings is Gerry and Sylvia Anderson's **UFO**.

Originally filmed in 1969 and 1970 and released stateside in 1972, this twenty-six-episode color adventure yarn by the creators of *Space:1999* was actually the first live action show to emerge from the Anderson team—an outfit which had previously distinguished itself with such fanciful Supermarionation TV fare as *Supercar, Thunderbirds* and *Fireball XL-5*. ITC is currently offering the hour-long series to stations across the country. Thus far, twenty locals have jumped on the *UFO* bandwagon, and with good reason. *UFO* is a show with an interesting premise. More often than not, it delivers top-notch SF swashbuckling.

The show deals with the premise that, by the 1980s, world governments will accept the presence of unidentified flying objects. According to the series, UFOs are believed to be a threat to the safety of the Earth. To combat the danger from beyond and insure the safety of an unsuspecting populace, a highly organized defense system is set-up, called SHADO (Supreme Headquarters, Alien Defense Organization). Protected by a veil of secrecy, this covert outfit is housed in an underground headquarters set up beneath a massive motion picture studio. The studio itself is both an actual film lot and a mere facade—a ground cover for the SHADO personnel below.

SHADO's second base is located on the Moon. Manned by a large staff (consisting chiefly of voluptuous female scientists), the outpost acts as a control center for interceptor craft. Week after week, both teams thwart the constant efforts of alien villains who seek to infiltrate Earth's defenses. The SHADO squads are aided by SID—a Space Intruder Detector described as "the last word in computers."

Featuring Ed Bishop as Commander Straker, George Seawell as Alec Freeman, Gabrielle Drake as Lt. Ellis and Michael Billington as Paul Foster, the series is chock-full of the nonchalant futuristic devices the Andersons were known to feature in their productions. Push button drinks, Earth-to-Moon craft, sleek underwater cruisers and humanistic computers abound.

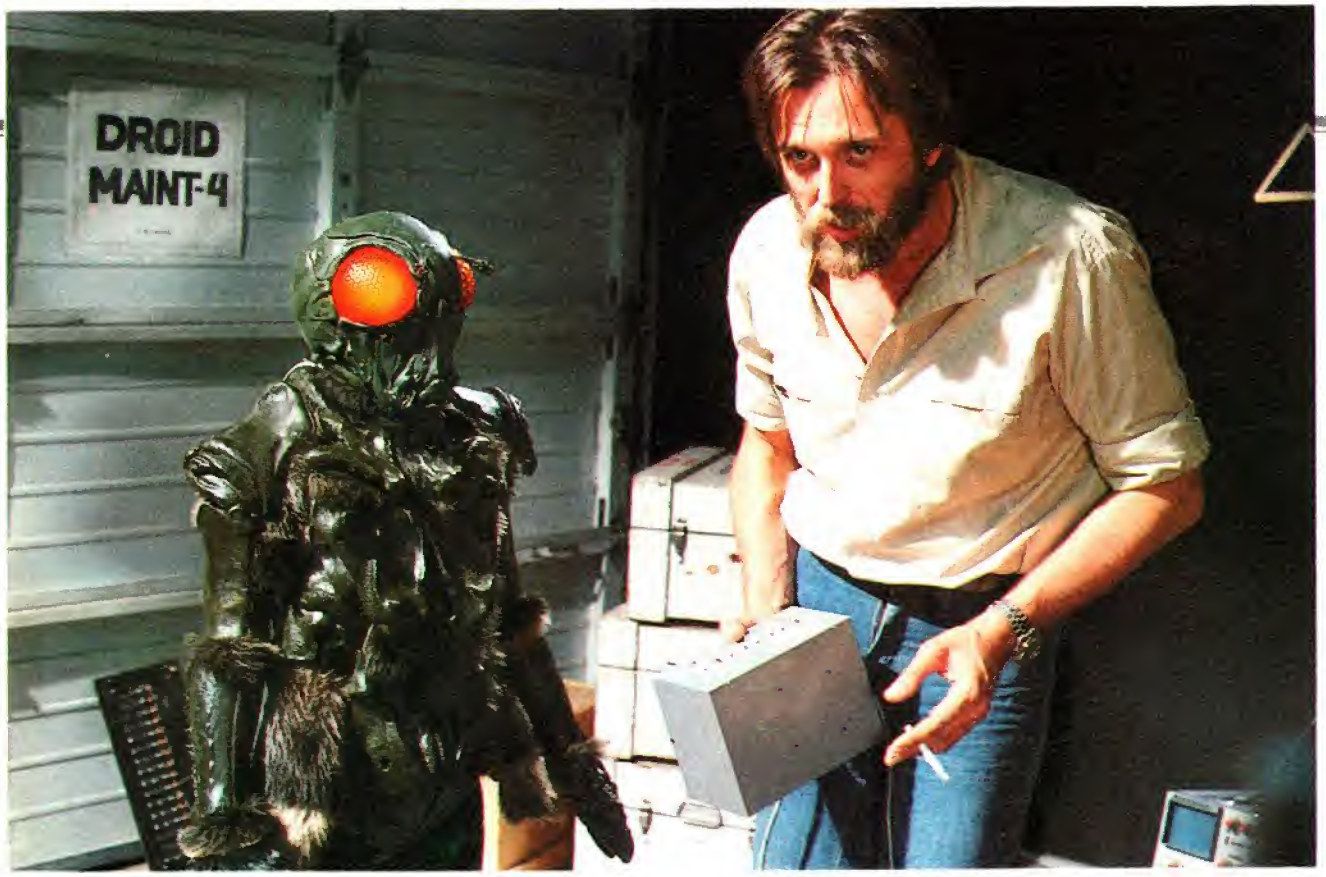
The entire tableau of SF scenery can be considered the dry run for elements later to find their way to *Space:1999*. At present, *UFO* is making the rounds on the neighborhood broadcasting circuit throughout the land. A good way to beat the summer doldrums.

DR. STRANGE: Casting has been completed for the two-hour CBS telefilm based on the exploits of Marvel Comic superhero Dr. Strange. To be aired this fall, the motion picture stars John Mills as Lindmer, Jessica Walters as Morgan and Peter Hoosten as the good doctor himself. The pilot was written by producer Phil De Guere.

BATTLE STAR *"GALACTICA"*: The long-awaited ABC telefilm *Earth Star*, originally scheduled for airing this season, has been postponed by the network until the fall. Formerly known as *Galactica*, this SF series pilot is, according to informed sources at ABC, "the most expensive television show ever filmed" with an average of one million dollars-plus earmarked for each hour. Among those onboard the series premier are Lorne Green as Commander Adama, Richard Hatch as Captain Apollo, Dirk Benedict as Lt. Starbuck, Jane Seymore as Sirena, Ray Milland as Uri, Herb Jefferson Jr. as Lt. Boomer, Wilfred Hyde-White as Anton, Marin Jensen as Athena, Lew Ayres as Adar, Terry Carter as Col. Tigh, John Fink as Doc Paye and Ed Begley Jr. as Ensign Greenbean.

The space age adventure will follow the exploits of the last twelve colonies of man in their attempts at ending a 1,000 year-old war with an alliance of alien beings. The humans will be headquartered on the 2,000 foot-long ship, *Galactica*. Created at John Dykstra's Industrial Light and Magic complex in California, the actual ship measures 72 inches and weighs 60 pounds. When seen on the TV screen, however, it will be a space titan. All the spaceships onboard the maiden voyage of this high-flying show were constructed from cannibalized model kits. The *Galactica* craft itself is composed of toy battleships, trucks, vans, tractors and tanks.

MAN AND THE COSMOS: Noted



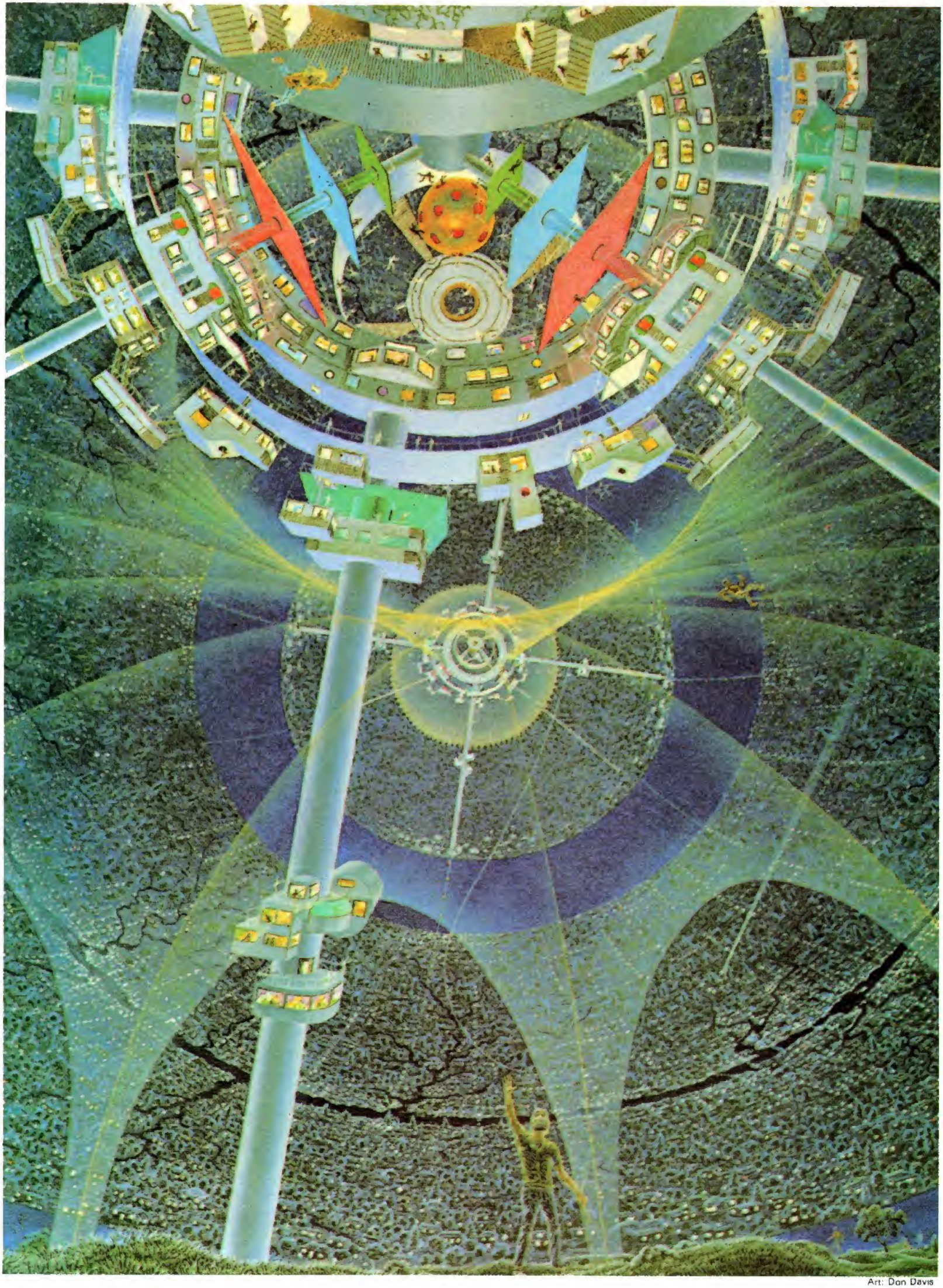
Left; "It's sheer joy making things that don't exist," Dykstra says of the new *Battle Star* "Galactica." "I can conceptualize without any consideration for many practical aspects. In essence, I'm free to construct my own separate reality." John Dkystra checks out one of the insectoid Ovions, who will match wits and skill with humankind.

space scientist Carl Sagan, the author of *The Dragons Of Eden,* will host his own science series on PBS, tentatively entitled *Man And The Cosmos*. The show will deal with the realm of astronomy and air in 1980. Sagan, whose involvement with space-oriented endeavors includes the creation of the recent Voyager *Sounds Of Earth* LP (shot into space for possible alien communication), will write and narrate the show himself. Adrian Malone, who directed PBS' prestigious *Ascent Of Man* series, will handle similar duties on *Cosmos*. Filming on the show will take place in 1979 and will include both location shooting and in-studio set-ups at television station KCET in Los Angeles.

TV PILOTS: The latest SF excursion into the video village is an as yet untitled TV film based on a cloning experiment. NBC has announced plans to film a two-hour pilot concerning the exploits of a biochemist who makes thirteen clones of himself in the initial episode. Should the movie capture the public's attention and the show be picked up on a regular basis, the clones would then be spread out around the world. Each week, the adventure of a different clone would be depicted. The lead actor would, of course, portray each one of his clones in slightly different makeup and garb from episode to episode. The telefilm is slated for a fall '78 airdate. Perhaps Xerox would be interested in sponsoring.

Photos: © 1978 Universal

Above: Dennis Muren, acclaimed for his "mother ship" photography in *CE3K*, checks a light level before filming a sequence with the "Galactica" ship itself, assisted by cine technician Don Dow. The Dykstraflex motion control system that was built for *Star Wars* is being used and operated by much of the same skilled crew that made *Star Wars* a landmark in SF.



Art: Don Davis

SPACE NOW!

An Interview With Keith & Carolyn Henson

Co-Founders of the L-5 Society

By ROBIN SNELSON

Editor's Note: The growing grassroots movement for the colonization of space is spearheaded by a wide variety of people who share the common goal of making orbital space habitats a reality. They are not just idle dreamers sitting back and wishing on a star—they have taken what they talk about to heart and practice here on Earth those skills that will be necessary for living in a self-contained orbital environment. Keith and Carolyn Henson, co-founders of the L-5 Society, are two of these dedicated people.

L-5 Society members are the people who are planning to live in space," explains co-founder Keith Henson. "This is where they find out what technical progress is being made, where the support—both governmental and private—is coming from, and what they as individuals can do to make space colonies happen."

"*And* how they can be first in line when the jobs start opening up out there," adds Carolyn Henson, co-founder and president of the L-5 Society and editor of the *L-5 News*.

The occasion is an organizational meeting of potential and current L-5 Society members, about 40 people gathered in an empty banquet room in the Huntsville, Alabama, Sheraton Motor Inn. They are attending a conference called "The First 20 Years in Space—The Next 20 Years in Space," sponsored by the local chapter of the World Future Society. Huntsville, home of NASA's Marshall Space Flight Center, is where Wernher von Braun and company worked, from the days of the early Jupiter C booster up to the mammoth Saturn V. This conference on the 20th anniversary of the first successful American space shot is part serious science, part celebration. Hugh Downs, president of the National Space Institute founded by von Braun, has just delivered the keynote speech in another room, concentrating on our accomplishments in the first 20 years of the space age.

But the people in this room are more interested in the possibilities of the next 20 years. They've come to find out about the L-5 Society, a group of people whose motto "L-5 in '95" means they hope to be *living* in space colonies in the L-5 orbit by 1995. At that time they plan to disband the society, since its job will be done.

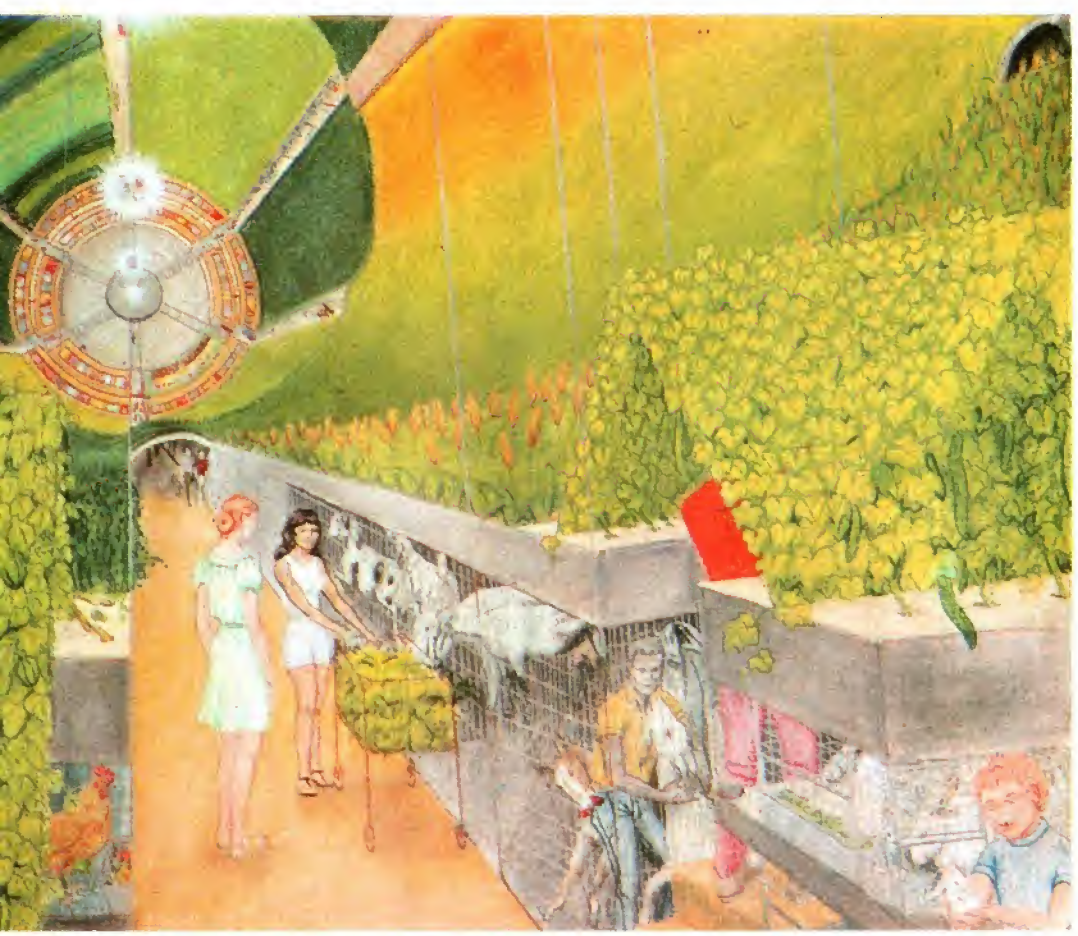
"Our purpose is to get us all out there," Keith Henson tells the group of young people. "We're not just interested in weather satellites and communications satellites—we want to GO! And become millionaires and come back to Earth to visit!"

"How do we do it?" someone asks.

Carolyn tells them. "We're in the middle of a big crisis. Our space program has its hands tied. We need to develop a serious space constituency, not just 'rah-rah,' but have educated ideas to push. I've talked to wide ranges of people and I've found that about 50 percent say they like the idea of space colonies and would want to go. The point is *we are powerful*. There is a sleeping constituency in your community just waiting for your leadership. What you can do is be a community organizer—mobilize your cities to action!"

Scenes like this have been repeated dozens of times since the L-5 Society began in 1975. One or both of the Hensons travel to as many of the conferences as the shaky finances of the L-5 Society will allow. When Keith travels on business (special computer installations), he often packs his L-5 slide show and gives "the lecture" to a local civic group or professional organization. The lecture introduces the concept of space colonies and of using extraterrestrial resources, such as energy from solar power satellites. Many of the 3,000 or so L-5

L-5 member and space artist Don Davis painted this view of a space colony for the only color issue of the *L-5 News*. (Man on ground resembles the artist.)



Carolyn Henson flies space shuttle simulator at Rockwell's Downey, Calif., plant where space shuttles are under construction (above). Farmer's market on a space colony (below), painted by Carolyn Henson. Carolyn did this painting to illustrate a paper on closed ecosystem agriculture, which she and Keith presented at the second Princeton conference on space colonies hosted by Gerard K. O'Neill. The scene bears some resemblance to the Henson family back yard.

members scattered all over the United States and in several foreign countries give their own version of the same lecture, spreading their view that space colonies mean a hopeful future.

Heading up this diverse society (consisting mainly of scientists and students) is Carolyn Meinel Henson, a 31-year-old mother of three. Keith provides substantial sideline—and front-line—support. They share the dream . . . though they'll argue points.

The Henson family homestead is a personable Spanish-style house in a middle class neighborhood in Tucson, Arizona. Out front there are orange trees, a servicable-looking station wagon and scattered evidences of eight-year-old Windy and nine-year-old Gale. There isn't a television in the house, but there's an admirable collection of well-worn science-fiction classics. In the back yard there are goats and chickens and rabbits and a couple of peacocks. In the comfortable kitchen, guests are likely to consume hearty portions of fresh eggs, goat's milk and anything-on-a-tortilla. Their self-reliant, back-to-basics life style seems, at first, the antithesis of what one might expect from such ardent space colony enthusiasts.

But it was exactly that life-style that got them an invitation to the 1975 conference on space colonies hosted by Dr. Gerard K. O'Neill in Princeton.

Carolyn and Keith started raising rabbits and all the rest some years back when they were starting their own electronics business, Analog Precision (now a thriving little company which specializes in custom computer installations). "In those days," Keith recalls, "we had more time than money."

They had been following O'Neill's work closely, ever since the appearance of his first *Physics Today* article in September 1974. But their common interest in space goes way back.

"We were married just before the first Moon landing," Keith says, "and one thing we checked each other out on very carefully to make sure we had compatible attitudes was that when the first lunar base opened for colonization, we were going to be there."

Naturally, the O'Neill scenario appealed to them. Keith wrote a letter to Dr. O'Neill, hoping for an invitation to the upcoming conference.

"I talked about our lifestyle—bicycling to work, gardening and raising a lot of our own citrus fruits, raising rabbits and goats and chickens, all on a very small lot in the middle of a large city—what I called an integrated lifestyle. Because it seemed to me it would be applicable to living in some sort of space colony, where you have the prob-

lem of doing a lot with a small area."

As it happened, the person who was scheduled to give the talk on space agriculture had to withdraw at a late date. Dr. O'Neill called Carolyn to ask if they could present a paper on the topic at the conference. Her first reaction: "No! Too little time!" But the temptation was too much, so Carolyn did some hasty research.

"I went around to all my friends at the University of Arizona, in environmental research and chemical engineering and agriculture, and asked them what we should say!" she laughs. "It was a real group effort."

For the paper, "Closed Ecosystems of High Agricultural Yield," they proposed growing grains, fruits and vegetables and raising rabbits, goats and chickens to provide a nutritional diet—something space colonists could sink their teeth into.

"Food not commonly eaten, such as yeast and algae, will not be considered," they stated flatly. The space farm proposed by the Hensons has been criticized as too ambitious for an early generation space colony (too expensive to launch goats) and somewhat optimistic in view of the limited success so far with closed ecosystem agriculture on Earth.

But as one of the conference attendees who is familiar with present-day plans for food production in space remarked, "The bill of fare you propose is certainly more appealing than distilled urine and chloraldehyde."

The Henson space farm may not be the last word in space agriculture, but it has at least raised or estimation of what space pioneers might expect to eat.

Back home in Tuscon that summer, Carolyn and Keith soon found themselves organizing the L-5 Society, almost by default.

"There were some other people who considered doing it and then for one reason or another—mainly because of the newsletter job, the work required—none of them did it," Keith remembers.

"We couldn't let it *not* happen," Carolyn explains, "because it would be like saying the concept was no good."

So, with the electronics business keeping Keith busy, Carolyn working on a degree in systems engineering at the U. of Arizona, two young daughters and all the responsibilities that go along with goats, chickens and rabbits, the Hensons took on a new project—the L-5 Society. Together with Bill Weigle, an aeronautical engineering student at the University of Arizona, they incorporated the non-profit society and published the first issue of the *L-5 News*. Their aim was to keep the lines of communication open between professionals actively working on aspects of the space colony concept and interested citizens, and to provide a forum for popularized versions of technical papers on the subject (best exemplified by some of Tom Heppenheimer's early stories, which evolved into his popular book, *Colonies In Space*).

The first four-page newsletter went out to a couple of hundred people in August of 1975. Membership multiplied and the business of running the society began to demand more and more time, until today Carolyn is completely immersed in L-5 work, assisted by a handful of dedicated volunteers and one paid staffer.

"Whenever we can talk Carolyn into taking out salary," Bill Weigle confides, "she always ends up loaning it back to the Society for a mailing or something."

She has delayed finishing her degree and devotes her time to masterminding the Society, keeping on top of germaine political developments and running the newsletter. Because of her impressive network of information sources in NASA, the aerospace industries and elsewhere, Carolyn Henson is undoubtedly one of the best-informed people around on the whole subject of space industrialization and space colonies. She is also one of the most articulate and sincere champions of the High Frontier concept.

No newcomer to grassroots political organizing, Carolyn ran for state senate in 1972, to publicize the issue of solar energy.

"I was talking about this terrible energy crisis coming up, and so the next year in 1973, when everybody was waiting in line at gas stations, people came up to me and said 'gosh, you're such a prophet, how did you ever pre-

L-5: A Place in Space

At certain places in any planetary system, the forces of gravity and centrifugal motion will cancel each other, resulting in stable points of space. Any object placed near one of these points will tend to stay in the area, orbiting the stable point. L-5 and L-4 are just such points, 386,000 kilometers from Earth and Moon on the Moon's orbital path. The stable libration points in our Earth-Moon system were first calculated by 18th century French-Italian mathematician Joseph Louis Lagrange, thus their name—Lagrangian points.

Gerard O'Neill proposed L-5 as a possible location for space colonies because they would reman in a stable position and would eclipsed only rarely, affording almost continuous access to energy from the Sun. If lunar materials are used in the construction of space habitats, orbital trajectories to L-5 appear efficient. Other locations for space colonies have since been proposed, but L-5 is still a top contender.

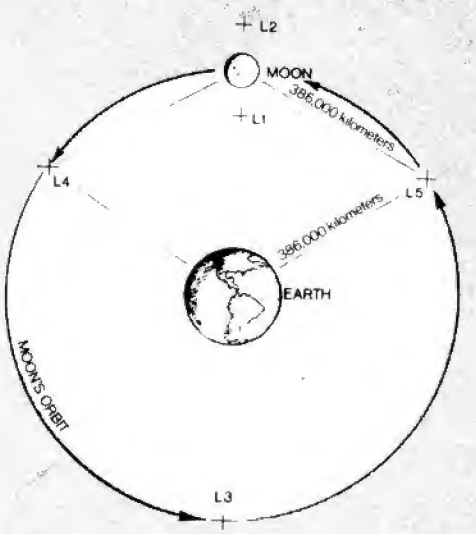
* * *

Why the L-5 Society and not the Space Colony Society?

"It's catchy," says Keith Henson. "Whenever you say 'I'm a member of the L-5 Society,' people always ask what's that? It gives you a lead-in for an explanation . . ."

Why L-5 and not L-4?

"Oh, I think there is some technical difference between L-5 and L-4," Keith says noncomitally. "But like O'Neill says, take any high orbit that happens to be useful and easy to get to and it will do fine."



L-5 members receive a monthly magzine, the *L-5 News*, which covers fast-breaking developments in space industrialization, satellite solar power and space settlements. Pertinent books and articles are reviewed; calls for papers, conferences, requests for proposals, contract awards and job opportunities are reported. In-depth articles and interviews with major workers in the field explore the problems and promise of moving into the space environment on a large scale. And perhaps most important, the *L-5 News* is a forum in which Society members raise and discuss what history may judge to be the most significant issues of our century.

Membership in the L-5 Society is $20, $15 for students. The L-5 Society is a non-profit organization and all donations are tax deductible.

L-5 Society
1620 N. Park Ave.
Tucson, Ariz. 85719

dict this?' Of course, the scientists had known about the brewing energy crisis for decades. It's like watching an egg fall to the floor and not knowing until it's an inch away from the floor that it's going to break!"

How did the campaign go?

"Well, running against a guy who'd never been beat and declaring only five weeks before the election on an independent ticket, I got 21 percent of the vote. And I even did 'awful' things like advocating women's rights to do what they please with their bodies, things like natural childbirth and breast feeding, because there are a lot of laws and hang-ups in our society that keep us from enjoying some of the most natural and beautiful things in life."

What motivates her to pour so much of her energy these days into the particular goal of establishing human colonies in space? She has a roundabout explanation.

"My parents are astronomers, so as a child I spent a lot of time hanging out in observatories. Now, my parents were not at all interested in any kind of fiction reading, they'd just want to read factual kinds of stuff. Many astronomers *are* interested in science fiction, however, so at McDonald Observatory when I was only seven years old I got my hands on some science-fiction books floating around." Her expression calls up all the wonder of the seven-year-old Carolyn's discovery. "I'll tell ya, it's really amazing to start reading science fiction at that early an age and suddenly realize that the world is changing very, very fast and the future can be very different from the past!"

She remembers Asimov as her favorite.

"The first science-fiction book I ever read," Keith offers, "was *Farmer In The Sky* by Robert Heinlein, in about the third grade I guess. And it happens, after all these years," he notes with obvious delight, "both Asimov and Heinlein are on the Board of Directors of the L-5 Society."

"It's only fitting," Carolyn rejoins with one of her pleasant unfettered laughs. "They got us off on this kick."

But plenty of kids read Heinlein and Asimov and haven't made such a personal commitment to making their science-fiction dreams come true. What moves the Hensons?

"We realized that if we waited around for the jobs to open up it would *never happen*," Carolyn says impatiently, "and the only way we're gonna get jobs in space is to do it ourselves!"

"Of course, there are many ways to rationalize what we're doing," Keith says. "Opening up a possible good future, supplying lots of resources. It's easy to rationalize. But there are lots and lots of good things that could be done that are easy to rationalize. Very few of them are just plain intrinsically exciting to do. There really isn't much left to do here. The highest mountains and the lowest valleys have all been explored on Earth. The opportunities are rather limited. There's apparently even a surplus of capital around. There isn't even an application for it right now. Nobody can think of anything really worth doing with what we have. With this one exception. . ."

"In other words," Carolyn says, "we're worried about things getting very, very BORING if we stick around on this planet too long."

Photo: P.K. Weis

What will it take to effectively get space industrialization and colonization into high gear? Keith offers an historical example.

"Before Kennedy up and committed the nation to the Moon landings, there were a whole lot of things going on in Congress. Effectively, it took a leader to pull all the factions together and set the goal. Exactly the same kind of thing is going on in Congress now, with respect to solar power satellites and space industries, the things which lead up to space colonies. There's a great deal of dissatisfaction in Congress with the fact that this opportunity is not being vigorously pursued. They're doing a good job, there are some helpful bills, but there's not really a whole lot more Congress can do. What we need is an Administration with some imagination.

"Or, alternately," he suggests, "since solar power satellites could generate enormous profits, it's possible some company-type organization might be formed which would take over the executive single-minded directiveness needed to get the job done."

Considering his allegiance to Heinlein (a well-known advocate of free enterprise) which scenario does he prefer?

"If it's going to be done in a short length of time, I'd say the private enterprise way would be the way to go."

Keith Henson may already have a stake in potential profits from large space construction. He and Eric Drexler (an MIT student credited by O'Neill in *The High Frontier*), hold a patent on a process called "vacuum vapor phase deposition"—a method which could be used to fabricate massive, seamless shells for space habitats.

Basically, the process involves inflating a balloon to the size and shape desired, then spraying it with metal until the metal is thick enough for whatever you want to do with the structure. What could it mean? According to Keith, "Real estate in space that is cheaper than real estate in Orange County."

By virtue of their close involvement with the High Frontier concept, both of the Hensons have given serious time and thought to how space colonies might eventually shape up.

"There will be a lot of different kinds," Carolyn says with a conspiratorial grin. "You'll have one for the sociologist-Great Society people, where they're very careful to regulate everyone's virtue, and the kids all go to day-care centers where they're inculcated with the proper societal attitudes so they won't be racist or violent or anything like that. And there will be another space colony where you'll have lots of rampant libertarians and they'll all own guns and shoot out the windows every now and then by accident.

"Seriously," she continues, "I really think there's going to be lots of variety and it's going to be exciting, like what happened when the frontier really started to open up in this country. You had the Quakers and the Mormons and Amish and Hutterites. . . Some of those early experiments went bust, while some of them—like the Constitution of the United States—turned out to be very influential upon the course of human events on this continent.

"I think we'll see a lot of people trying out new ways of living and working in space, and a lot of those experiments will probably be failures or lukewarm. But I'd like to think we will come up with *at least one* experiment that's as innovative as the United States Constitution was in a world dominated by hereditary aristocracy."

What kind of space colony would the Hensons like to live in?

"The one we own." Keith is only half-kidding.

"Yes, our fiefdom," Carolyn adds wryly. "We'll set up people with chain mail to protect our property." The image inspires another thought: "There probably will be some creative anachronism people who will fabricate their own little pockets of history to live in."

"One group laid out the entire map of Middle Earth to scale in the interior of a space colony," Keith reports. "It had to be distorted a little bit to fit the cylindrical shape. . ."

"To be serious," Carolyn says, "I don't really know what kind of society we'd like to live in. I think it would be nice to try out several, and I think that will happen. People will hop around from society to society the same way they might live in Baltimore and decide to move to Atlanta, or wherever. I'd like to see a lot of different human cultures in space. It'll be really enjoyable to find out what's the nicest way to live, what really realizes our full potential as a species."

For anybody still puzzled by the apparent contrast of the Hensons' natural, countrified lifestyle and environmental attitudes, and their advocacy of such a major technological undertaking as space colonies, Keith and Carolyn have a few words.

"We tend to dump our resources into crazy shemes like electronics companies and space colony societies," Carolyn notes.

"On the other hand," Keith muses, "we take out our riches in capial gains. Although we don't take out much in the way of salary, we've done very well in the last few years building up an electronics company that is worth a lot of money at this point."

"What it boils down to," Carolyn says, "is buying machine tools and office equipment and *building* instead of buying cars and fur coats. Of course, that's what this whole thing about exploiting the space environment is about—we're saying, look, let's take a little bit of our national income and *invest it* for a change instead of pouring it all into current expenses every year. And someday we'll be very thankful we made that investment.

"We're talking about taking things we already know and finding a way to make money out of them, make them useful, turn them into jobs and homes for people in space."

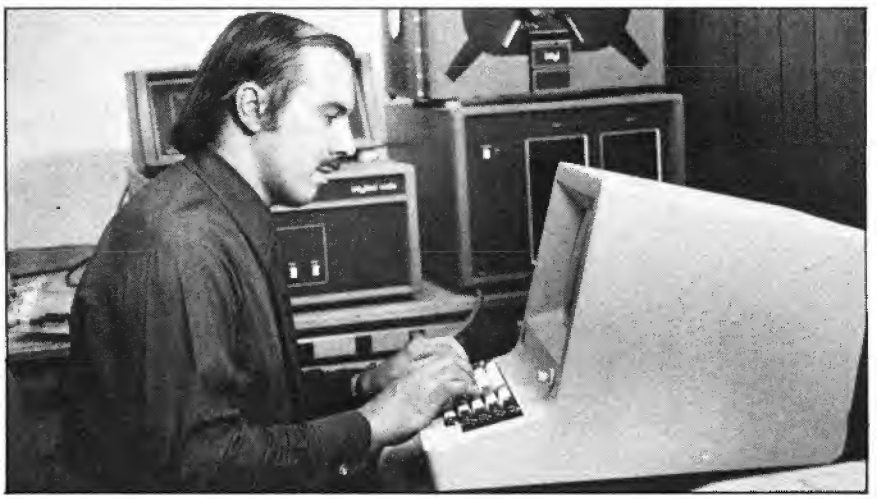


Photo: Rockwell

The Hensons at home (left), disrupting TV reception for blocks around with Keith's Tesla coil, a high school science project which generates one million volts of electricity. (Sorry, no light saber—that's a fluorescent bulb.) Rockwell official Ted Littman gives Carolyn a tour of the shuttle plant (above left). Keith at work at the family business, Analog Precision Inc. (below left). Specialized computer installations are one of his fortes.

Photo: Steve Bell

sf graphics

Each issue of FUTURE will examine the world of advertising and promotional graphics. The talented people who sell science-fiction to the public by adding reality and excitement to numerous products have remained invisible for long enough. Their work will find a proper showcase in this regular feature.

By RICHARD MEYERS

A full ten years before Princess Leia Organa sent audiences' hearts aflutter with her brand of feminist heroics, a full-bodied female roamed the cinematic galaxies righting wrongs, having fun and putting cosmic chauvinists in their place. Her name was *Barbarella* and she ruled French comics pages long before director Roger Vadim and producer Dino DeLaurentiis decided to embody her, in 1968, as competition for the likes of *2001* and *Planet Of The Apes.*

Originally, commercial artist Bob McGinniss was commissioned to juxtapose the supra-realism of *Space Odyssey* artist Bob McCall (see elsewhere in this issue) and *Apes* photography with his own colorful view of Jane Fonda in the leading role with her futuristic foes. His vision did well enough, since the film was one of the bigger box-office grossers of that year. But times change and when *Star Wars* made the scene, DeLaurentiis' organization decided it was time to re-release their science-fantasy femme.

They also thought it best to redesign the advertising campaign, since photo-realism had been replaced with muscular imagery and sensuous exaggeration. Naturally, one of the first artists called was Boris Vallejo. But he was, by no means, the only one considered. "You have to realize," Boris explains, "when an agency gets a commission they have to submit a finished painting and the other agencies bidding for the same contract have to do the same. In this case there were 4 or 5 agencies bidding. It was a big campaign."

Both the campaign and DeLaurentiis' pocketbook were big enough to attract the greatest names in fantasy art.

Boris elaborates on the situation. "The artwork director for Dina Hauser, one of the biggest agencies in New York, called and asked if I would come to a screening. I had previously done a poster for *The White Buffalo*—which was a DeLaurentiis movie—so I suppose they carried on from that. I said 'of course,' and who else happened to be at the screening but the Brothers Hildebrandt, fresh from their *Star Wars* poster. I knew right away it wasn't going to be easy, but I welcomed the competition. It always makes me try harder."

Any artist's maximum effort is usually required in the film poster biz, time and imagination being at a premium. "Movie posters are always such a rushed thing," Boris complains. "They give you a commission and you have to produce it in, gosh, 3 or 4 days. The whole thing, beginning to end: concepts, photographs, sketches—everything has to be done in a rush."

Left: Bob McGinniss created the first poster design utilizing a "Bridgit Bardot" concept of Jane Fonda as *Barbarella.* Right: The Boris version.

Everything has to be done to the agency's specific instructions as well. Boris discovered that *Barbarella* was no exception to the rule. "They wanted the *Star Wars*-meets-*James Bond* approach," he recalled. "You know, the spaceships and creatures all around with the heroine very prominently in front. We discussed the whole thing before I ever put my hands on the canvas. It's always like that, but if I had my freedom I wouldn't have done it that way. I certainly wouldn't have done it the way it turned out."

Boris elaborates. "Basically I don't like too many elements in a painting—it's distracting. I like to have a focus of attention that really strikes the eye. Like a punch in the nose. I feel *Barbarella* lacks that. It's too scattered around, there are too many things happening; your eyes travel around too much. Even using the same elements, I would like to have muted the ingredients more, so the heroine would really pop out."

One of the ingredients most notably missing in this second version was John Phillip Law's wings. In the original he was flying across the night sky, but in the Boris version he's grounded and wingless. "This is a very peculiar thing," the artist confesses. "I actually thought that the wings added a nice element to the poster. However the agency, and I think this was also discussed with Paramount, felt that they would make the work look "old-fashioned." I said, 'Why should it? The guy's an angel in the film—he's not a regular fellow.' They just said, 'Never mind—the wings are out.' "

Even with this omission and the work's complexity, the Hauser agency called the artist a week after he finished and told him DeLaurentiis bought the painting. Presently, with art done for *Damnation Alley* and *The Man Who Loved Women* in addition to his two DeLaurentiis posters, Boris' cinematic attitude remains unchanged.

"The people in the movie industry are really unconcerned about the art. They want a certain artist and feeling, but once it's done, that's it. It makes no difference to them—it's very impersonal really. As far as I'm concerned the main attraction of the poster business is the money." What refreshing honesty!

Art: Boris

art: Karen Toffler

"Teaching ourselves to expect change is a very important technique for coping with change," says author Alvin Toffler, explaining anti-*Future Shock* tactics.

ALVIN TOFFLER

Photo: David Hutchison

AFTER FUTURE SHOCK

By ED NAHA

Alvin Toffler's office is located in the heart of a great megalopolis. From his window he can see the winds of change that are blowing across the land reflected back in concrete and steel; demolition and construction. The newspaper on his desk is filled with the symptoms of a world in flux: the use of bombs that destroy people but not property is debated in Congress; the search for new energy sources becomes a mad scramble in the face of the upcoming oil depletion crisis; border wars spring up around the globe like brush fires as the super-powers rush to supply them with new and bizarre weaponry while condemning them in the U.N.; satellites leaking radiation crash to the Earth while others carrying laser weapons are placed into orbit; the cloning of humans is discussed in bars and on A.M. talk shows. And so it goes.

And yet, despite this current, oppressive reality, futuristic author/thinker Alvin Toffler foresees a positive path for our puzzled citizenry and a society that has grown incautiously, and seemingly out of control.

"It's like the entire society is being picked up and propelled into the future," Toffler marvels. "A future for which not everybody is ready, but a future for which everybody *can* be ready. What we are experiencing, really, is the dawning of an entirely new civilization. It is both our tragedy and our privilege to live at precisely this exciting moment in history."

Collage by Karen Toffler

Alvin Toffler is a man used to living in future tense. In 1970 he shook the world to its rafters with the publication of his prophetic book, *Future Shock*. The work accurately portrayed the confusion of everyday man in a society dominated by constant change. *The Wall Street Journal* called it "explosive," and *The London Daily Express* noted that it sent a "shock wave through Western society." Since that time, the book has been translated into over 20 languages, selling over six million copies and becoming a space-age Rosetta for countless citizens of spaceship Earth who find themselves facing technological and social trends they just cannot comprehend.

> "I see us living in a hinge of history. For those of us who have spirit, funk and energy, it's a terrific time to be alive."

Today, eight years after the book's appearance, Alvin Toffler doesn't see the existence of future shock in quite as dire a light as he once did. In fact, the phenomenon may help bring about a better society if measures are taken to combat its effects. Recognizing the danger of the malady is half the cure, the author reasons, and the symptoms aren't all that hard to spot. "Future shock," Toffler states, "is what happens to people when they are subjected to a great amount of change in too short a period of time. When people are suddenly asked to change their job, their school or their community . . . these changes compel us to alter our way of life quickly. They require us to adapt. If these changes come too rapidly, we are put under a great amount of pressure. If people are put under too much pressure too quickly, they display strange behavior. They may become confused, bewildered. They may sink into apathy or they may become violent. I think if you look around us at the number of flaky people and the tremendous sense of purposelessness and indecision on the part of millions of people, you can see future shock at work."

Although today's state of global anxiety certainly seems devastating, future shock itself is not new to mankind. "If we define the experience as that which happens when a person is subjected to too rapid a rate of change for him to adapt to," Toffler points out, "then future shock could have occurred to individuals at any time during history, from the Renaissance to the Industrial Revolution. But *never* before have we seen an *entire* society caught up in such an extremely rapid and accelerating rate of change; social, political, technological. It's a situation where, literally, millions of people are being forced to modify their lives every day."

ORGANIZATIONS DEVOTED TO FUTURISTIC THOUGHT

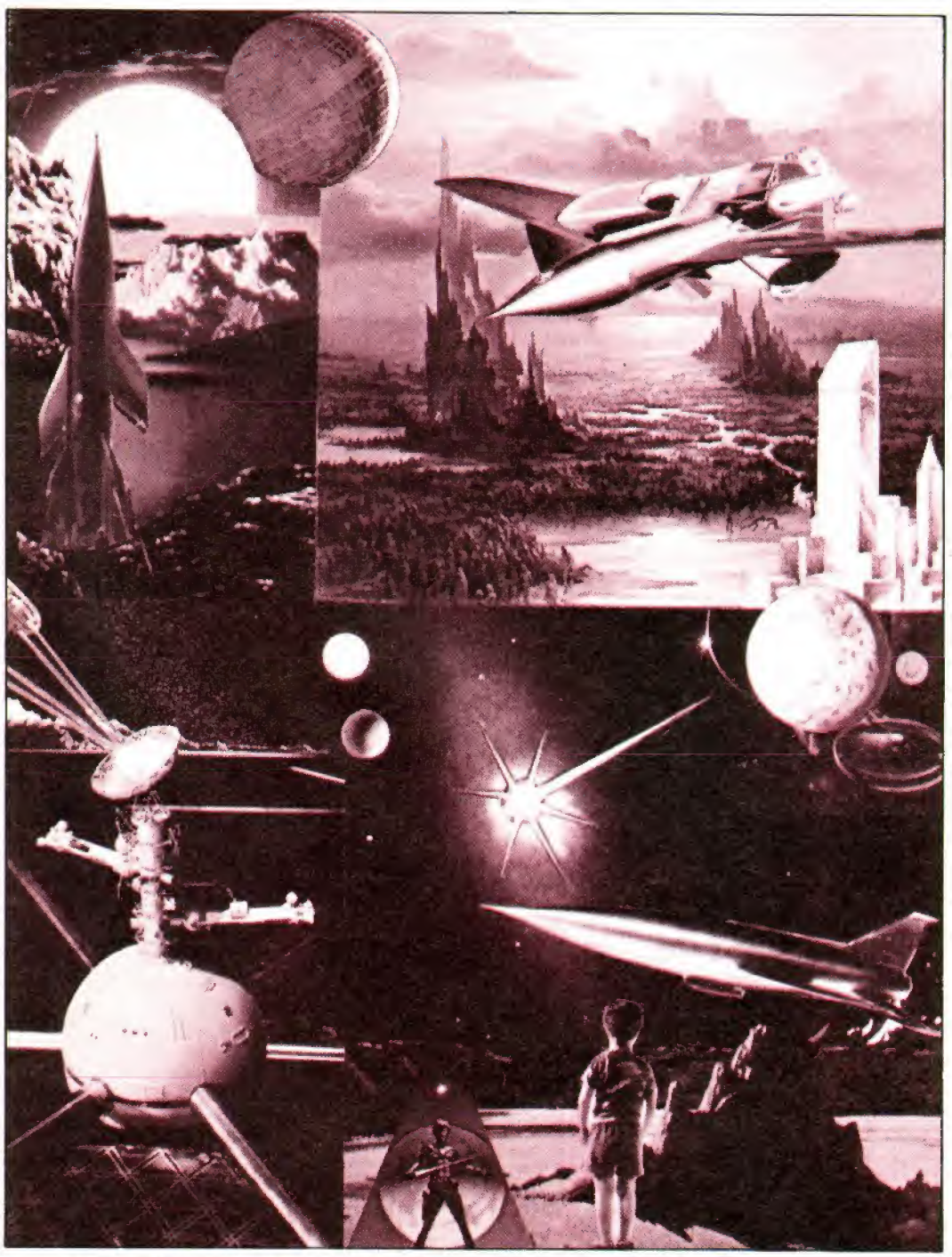
Forum for the Advancement of Students in Science and Technology (FAAST)
2030 M. Street, N.W.
Suite 402
Washington, D.C. 20036

National Space Institute
1911 N. Fort Meyer Dr.,
Suite 408
Arlington, Va. 22209

World Future Society
4916 St. Elmo Ave.
Washington, D.C. 20014

Worldwatch Institute
1776 Massachusetts Ave., N.W.
Washington, D.C. 20036

Committee For The Future
2325 Porter St.
Washington, D.C. 20008



art: Karen Toffler

Alvin Toffler does not necessarily believe that the future will be a totally rosy one but thinks that everyone can help construct a better tomorrow. "Let's put our imaginations to work picturing the best of all practical worlds," he says.

Toffler readily admits that the world-at-large seems ready to accept pronouncements of doom at every possible chance. Yet he feels that, if an individual fights back, every change made on the day-to-day level can be for the better. In fact, the author goes as far as to suggest that the traumatizing effect of future shock can be avoided by just a small amount of mental planning on everyone's part.

"Teaching ourselves to expect change is a very important technique for coping with change," he says. "We go through life not expecting change, assuming that everything happening now is going to continue to happen forever. In this way, we set ourselves up for a sequence of surprises, many of which may be unhappy ones. If we train ourselves to anticipate the liklihood of change in our own personal lives as well as in society, we ease the shock of change as it comes."

Half of the battle against the onslaught of future shock, Toffler reasons, can therefore be fought and won in a person's mind. "I think that developing a future consciousness (getting together with other individuals and planning for the future, discussing the future, speculating about the future, reading about the future) helps us cope with changes as they come along," he stresses.

Toffler confesses that the complexity of present day society can be overpowering and produce a feeling of anxiety and helplessness. However, if the effort is made, passive pessimism can be turned into active optimism within a short period of time. "I think there is a sense today of being overwhelmed by what seems to be an enormous amount of threats," he smiles. "We have all been bombarded by pessimistic writers. I think it's justifiable to be pessimistic if what you expect out of a short-range future is peace and quiet and all signs point to upheavel and turbulence in the next decade or so ahead.

"But if you see past that period and view what is, in effect, the beginning of a new civilization, everything becomes more optimistic. There's the hope that, if we get through the next transitory ten or twenty years, we will enter a society that may indeed be more humane, more decent and maybe even more democratic than the one we're in now. And I believe the time has come for those of us who write about the future, whether it be science fiction, movies or non-fiction, to portray the optimistic possibilities as well as the dangers. Pumping pessmism does everyone a disservice. Pessimism beyond a certain point paralyzes us into precisely the kind of passivity that guarantees the worst outcome.

"Consequently, I think that it's time

we look at some of the positive possibilities of the future, which we really haven't done recently. And that implies our taking an active stance towards the future. We must assume that the future is *not* inevitable and that, in fact, changes *can* be made. Changes made by you, by me, by everyone."

The world can indeed evolve into a better place, Toffler believes, if everyone embarks on a futuristic lifestyle; the key is to combine dreaming with doing. "First of all," Toffler says, "I think we should concentrate on what a decent life *should* be like in the future. Having gone through a period of sort of a simple-minded Utopianism and then a period of anti-Utopianism, I think it's time we all explored something I call *practopianism*.

"A practopia is different from both a Utopia and a distopia. It's a concept that says: let's picture a society that is *not* the best of all possible worlds (wherein all pain, crime and evil have been dispelled and everyone lives in a state of euphoria), but let's put our imaginations to work picturing a society that is the best of all *practical* worlds. A world that is plausible, a world that we might indeed construct during the next twenty years."

Toffler advises that this practopia be envisioned as a totally *workable* environment. "Better than the one we're in," he explains, "but not fictionally ideal. We must construct a world that makes use of all the exciting possibilities of both technological and cultural developments; not an ideal society, but one with roots. Once we form that in our minds, let's see if we can't imagine many alternative forms of that society, then pick the best. Rather than assuming that technology always moves us towards greater bureaucracy and greater impersonality, let's try to think of the fantastic array of future technology at our fingertips and then carefully *select* which ones take us *where we want to go*. We have a lot of positive options as well as fearsome ones. The future is not just a bleak, negative landscape. We can do some imagineering. We can visualize a real alternative civilization for ourselves. Once that picture is crystalized, we can work backwards along the lines of what we do *now* to bring that about."

Toffler acknowledges that just fantasizing about the future isn't going to hasten its arrival. "We all have to really *work* towards that goal," he says. "If you're a teacher, it means that you should be introducing much more experimental and future-oriented methods in your school. So, you'll be up against a system. You just might have to find a small group of teachers who think like you and organize them. If you're in industry, you've got to look at the technology that your company is producing and within your own job network, fight against environmentally dangerous technology. If you're a student, try to think and act futuristically."

Toffler readily admits that the fight for a better future can be viewed as a losing battle, replete with cerebral Don Quixotes jousting status-quo windmills. But, despite the general public's awesome fear of what the future may bring, Toffler feels that the futurists have a chance of swaying public opinion by publicizing the positive effects that reasoned change can bring to the society. "I don't think that you can avoid being aware of the dangers of future technology," he concedes. "But you need to have sufficient fight inside you to say 'we shall overcome.' Historically, people faced all kinds of terrible uncertainties and dangers successfully. There's a sort of life-affirming spirit within us that seems to overcome all obstacles.

"Sure, I know it's a frightening environment out there, but at the same time it's a challenging and exhilarating one. It's as though we live in a particular moment of time when, unlike most other generations in history, we can have a great *impact* on the way things go. Now that impact may be more in terms of political or collective input as opposed to individual clout but in the past most people knew that, from the day they were born to the day they died, they just didn't count. They would never be able to change the direction of history. Even if they were successful revolutionaries, they couldn't change the direction of social evolution. Today, that's just not true. It is now possible for *us* to make decisions that change the biological, political, social, cultural and psychological future of the human race. I see us living in a hinge of history. For those of us who have spirit, funk and energy, it's a terrific time to be alive.

"I think if you look around us at the tremendous sense of purposelessness and indecision on the part of millions of people, you can see future shock at work."

"Nobody should try to stop change. It can't be done. It would be immoral to try. We should try to accelerate certain changes like the changes in our practices with regards to the biosphere. We should try to accelerate changes which increase the likelihood of human survival and decelerate changes which run contrary to that goal."

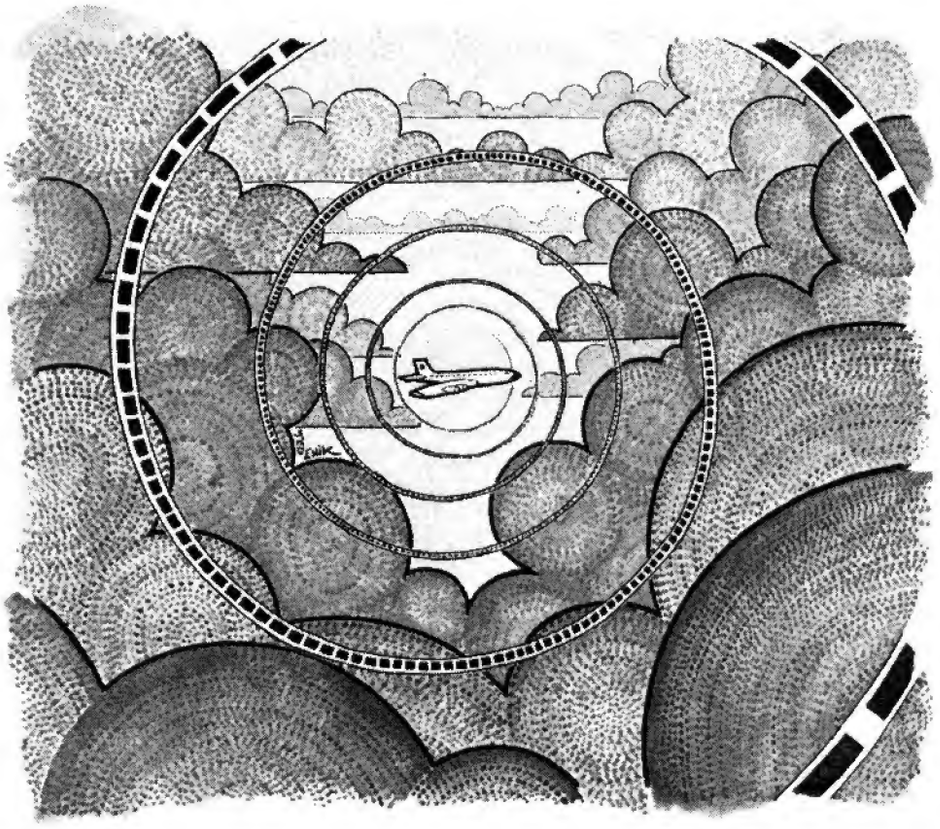
And everyone, no matter what age or occupation, can have a hand in shaping the future. According to Toffler one of the best ways to enter the world of positive futurism is through interaction with futuristic groups. One of the largest organizations of this type in existence is the World Future Society. "It has 20-25,000 members," Toffler, himself a member, reveals. "And it has branches from California to Massachusetts. In those branches you'll find a wide variety of people who are interested in the future: from students and housewives to space engineers and theologians. These branches meet for self-education seminars but they also come up with community projects and have, in fact, made significant changes in their surroundings."

Futuristic thinkers may also join statewide organizations dedicated to future concepts. States such as Hawaii, Iowa and Washington have now established such groups and many other states are following their lead. Although some of these groups are just struggling to get off the ground, Toffler advises that "any individual interested in democratizing the future [should] get in touch with them. They are citizen organizations; open to everybody."

As well as joining existing futurist enclaves, Toffler suggests that aspiring futurists instigate change on a personal level as well. "You should find out whatever topic it is you're most interested in and place it in a future perspective. If you're interested in making changes in health or whatever, go into existing organizations devoted to these subjects, not organizations that are already futuristic, and make noise about the future. Force them to think in the future tense. That kind of revolutionary activity can be applied to every group in existence from the Boy Scouts to the Pentagon to your local Church. Every organization should be devoting some of its time to thinking about the future. Unfortunately, many people are historically provincial. They can't see beyond the present. So, a surge of readers of this magazine carrying the banner of 'the future' would be a very healthy boost for futurism."

Toffler leans back in his office chair for a momment and relaxes. A bright burst of afternoon sunlight suddenly pours in through the window behind him. For a moment, the constant drone of traffic noises arising from the city streets below instantly seem to disappear—blanketed by an overpowering dream of a possible reality, a better reality. "The future ceases to be a frightening spectre once you envision yourself as part of it," Toffler smiles. He turns towards the window and the world outside. "The future is really up to us, you know. We can take it in whatever direction we want it to go."

The Navy Drops a Boom Theory



Art: Ted Enik

By BOB WOODS

Beginning last December 2 and continuing through the end of February, residents along the coastal regions of New Jersey, South Carolina and Nova Scotia reported hearing mysterious booms. Individual accounts, in most instances, were later confirmed by and correlated with scientific data taken from acoustic and seismic recording equipment operating in the areas.

During that three-month period, hundreds of boom reports were logged, and at least 180 such events were recorded by scientific observers. Nobody was even sure what to call them: "Mystery booms," "atmospheric shock waves," "acoustic phenomena," "air quakes."

On March 3, the Naval Research Laboratory released an executive summary following a two-month investigation into the phenomenon. NRL concluded that the apparent cause was an unusual sonic-boom effect from military aircraft operating in the region. Because this winter's extreme weather conditions created temperature inversions (a critical meeting of cold and warm air masses), ordinary sonic booms were bounced extraordinary distances in unpredictable directions.

In all probability, this is a most likely and plausible explanation. But, for many critics, questions and doubts remain.

According to NRL's records: "Events were described variously as being like sounds heard from artillery gunfire, bombs or other ammunitions exploding, or most frequently as being like the sound heard when a heavy truck or car collides with something nearby." Most booms were reported occurring out at sea, though some residents heard the blasts over land. Still other witnesses saw flashes of light accompanying the sounds.

The most startling events occurred between 10:00 a.m. and 3:45 p.m. on December 2, off the coasts of New Jersey and the Charleston, S.C. area. The NRL study stated that most of the booms were only heard indoors and usually in a frame house with storm windows. There were accounts of windows breaking, garage doors violently rattling and vibrating and entire buildings shaking. The events typically lasted 30-40 seconds and the source height was calculated at 2500 meters or less, according to NRL.

Acoustic recordings, using extremely sensitive microphones which pickup atmospheric disturbances, were made by the Lamont-Doherty Observatory (of Columbia University) in Palisades, N.Y. The operation was conducted by Dr. William Donn, as part of ongoing work at the observatory. Dr. Donn has also received hundreds of personal accounts. Airborne acoustic signals were also received by seismic detectors at three stations in Connecticut and one in Massachusetts, all part of the seismic network of Boston College's Weston Observatory. Booms in the Charleston area were recorded as an acoustic signal by two seismometer stations operated for the U.S. Geological Service by Baptist College. The Nova Scotia noises, for the purposes of the NRL study, were taken from individual accounts.

In other words: F-4, F-14, F-15 or F-106 jets flying through cold air masses move into supersonic speed. The resulting boom is normally deflected above and behind the aircraft. But the presence of a warm air mass above the jet (temperature inversion) could bounce the boom downward 120 miles from its point of origin to be heard well after the plane passed overhead. The boom is also magnified by another type of distortion caused by unusual winter winds. Such meteorological conditions were apparently frequent during this past winter.

So much for swamp gas. The government is satisfied with its "official" explanation.

NRL drew up a chart showing correlations between reports of booms and the presence of military jets in the adjacent warning areas. Corrective action—altering of flight patterns and maneuvers, and determination of ripe meteorological conditions—were recommended. (Though, to date, the Air Force has done nothing.)

Many experts agree that the explanation certainly sounds plausible. Others have their doubts. What about the Nova Scotia reports which came in after the *Concorde*'s flight path was corrected? Are there possibilities that NRL did not probe? Was this just a hasty conclusion to quiet public concern? Maybe the government didn't want to be caught without an explanation? Besides, there have been plenty of cold winters and such military flights have been going on for years. And "air quakes" have been around longer than supersonic flight.

James Oberg, a NASA consultant, noted that historical records dating back centuries show evidence of such booms in various places around the world. He has been watching this phenomena with special interest and was somewhat surprised with the NRL explanation. Oberg senses that the explanation may just have been as simple a solution as the government could provide following a relatively short investigation.

Dr. Donn, in charge of boom studies at the Lamont Observatory, is waiting to see the full, printed report from NRL. "The executive summary," he said, "leaves something to be desired. There are conclusions but no data. There is information missing." Dr. Donn feels that it was not a very scientific investigation and not the sort of report that would be accepted in a

scientific journal. He, too, wonders about similar booms in the past, before supersonic speed was ever achieved. Dr. Donn, who has been filing away scores of personal accounts, has some of his own ideas and theories, but is sitting on them for now, perhaps until the right kind of offer comes along.

"It was a sonic mirage," Isaac Asimov ascertains. He was not surprised by the official explanation at all. In fact, he offered such a theory in the very beginning. "For my part, I always think that the simplest explanation is most likely to be true, and that as far as inventing enormously unlikely explanations, I'm as good as anyone at that."

But some of the unresolved mystery remains. If the booms continue when warm weather arrives, there will be many more questions in the air.

From the first, "mysterious" was the common description for the odd occurences. Government officials were at a loss for an acceptable explanation, as were scientists. The military was questioned and claimed that no unusual operations were being conducted and that no sonic maneuvers were taking place in the area of the reports. Oddball theories started brewing: UFOs, secret government experiments, explosions from giant methane bubbles rising from the ocean's floor.

On January 5, in response to a memo from the Department of Defense, the Chief of Naval Research directed the NRL to form a study group to investigate the causes. The group included experts in acoustics, nuclear weapons testing, atmospheric phenomena, ocean science, chemistry, geophysical exploration, shock hydrodynamics and military operations.

The team compiled information from the Lamont and Weston Observatories, the Baptist College station, military and commercial flight records, individual accounts in New Jersey, South Carolina and Nova Scotia and various other governmental and scientific agencies.

Naval investigators drew up a list of possible theories and set out to prove or disprove them. Several man-made causes were immediately ruled out: nuclear explosion, military research and development activities, military explosions, civilian use of high explosives, ship disaster, USSR ship operations, geophysical explosions, and missile launches and low altitude satellites.

At first the Concorde's supersonic flights were held to be a possible source of the Nova Scotia booms. However, residents continued to hear the strange sounds even after the Concorde's flight path was moved 40 miles further out to sea.

Next, the NRL team reviewed and classified as unlikely several natural phenomena: High altitude aerosols, earthquakes and tremors, meteorites, winter lightning, methane explosions.

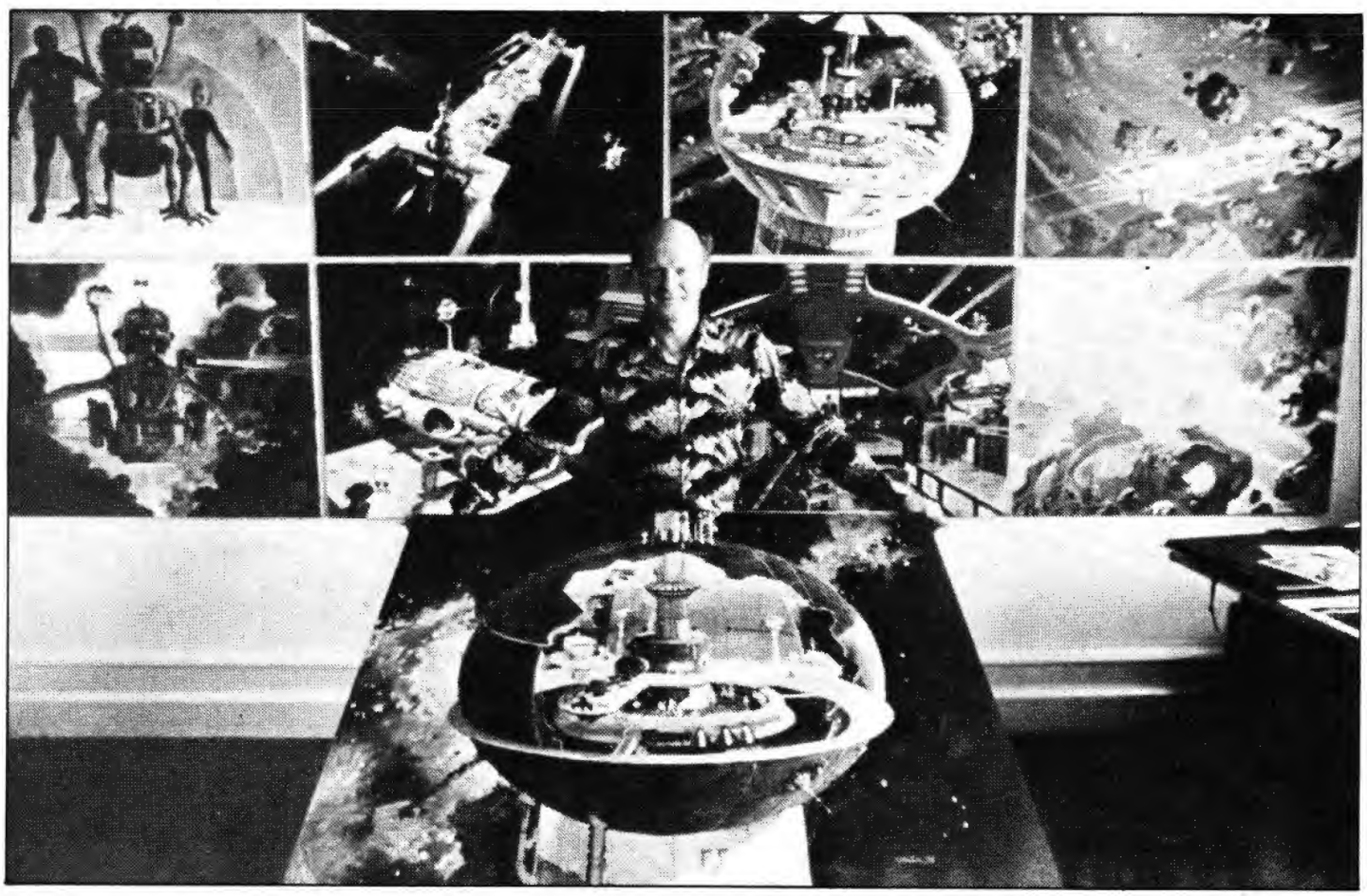
This left one serious area of exploration—sonic booms from military aircraft. Yet, from the time the booms were first reported, this theory had been ruled out. Even at the outset of the NRL study, Air Force R&D officials said there were no supersonic flights *directly* in the areas in question. However, further into their investigation, with most of their other theories already discounted, NRL rephrased their inquiries to military sources. Investigators now asked if aircraft capable of supersonic flight were in the *adjacent* warning areas (where supersonic flight is permitted) at the times when convincing citizens' reports and measured acoustic events coincided. Bingo! This query produced positive answers that led to "convincing correlations."

"No instances were found," NRL concluded, "where significant acoustic disturbances were detected by citizens and scientific observations where supersonic aircraft were not present." Why were they heard from such an abnormal distance if supersonic flights are routine? Again, Bingo! "A ray tracing based on the atmospheric conditions . . . show that supersonic booms should be heard as far away as 55 nautical miles from their sources at altitudes above 1500 ft."

To Envision The Future:

An Interview With America's Premiere Space Artist

Bob McCall



By ROBIN SNELSON

Isaac Asimov calls Bob McCall the "artist-in-residence of outer space." The Smithsonian Air and Space Museum called on Bob McCall to paint a magnificent six-story mural, a dramatic tribute to the space age. NASA has called on Bob McCall since the beginning of the space program to document its achievements and make its future come to life on his canvas. Disney called in Bob McCall to spark ideas for its still-awaited cosmic epic, *Space Probe,* and the producers of the new *Buck Rogers* TV show have called on him to sketch out spacecraft concepts. But that's not all . . .

Stanley Kubrick called him in 1968 to paint the posters for *2001:A Space Odyssey*, and the Postmaster General has called upon him to design stamps commemorating the Moon landings and Apollo-Soyuz. Russian space artists have called on him in his studio on Moonlight Way in Paradise Valley, Arizona, and this summer he plans to repay the visit when he tours the Soviet Union as a guest of the Union of Artists.

The "artist-in-residence of outer space" doesn't have a studio in high Earth orbit yet, but he allows himself to think about the future possibility of a call from NASA . . . offering him a seat on the space shuttle.

It will hardly surprise McCall if/when

Above: McCall stands proudly amid completed pre-production paintings for upcoming Disney SF-adventure *Space Probe*. Opposite page: Astronaut fires maneuvering unit, and McCall captures the exhilarating feeling of actually shooting freely through space.

"Apotheosis of Technology" (detail) combines some of McCall's favorite elements in a futuristic planetary setting. Anti-gravity cities, streamlined spacecraft and massive architecture surround an obelisk straight out of antiquity.

ART COLLECTORS

Since the days of Toulouse-Lautrec and his legendary Moulon Rouge posters, the value of signed, historic poster graphics has remained undisputed. Bob McCall and Eric Sloan, the two artists who collaborated on the now famous Sky & Space Show at New York's Grand Central Art Galleries, agreed to print and hand sign a special limited edition of 500 exhibition posters. The McCall poster, *Apotheosis of Technology,* is reproduced in full fidelity color on collectors' quality stock. McCall personally signed and provided a registration number on each of these historic 30" × 25" posters. The remaining numbers are being offered here to FUTURE readers only as long as this limited printing lasts. Please rush cash, check or money order in the amount of $22.00 ($20.00 each plus $2.00 for postage and handling) and include your printed or typed name and address. NOTE: Orders filled on a first-come, first-serve basis; when supply is depleted, money will be returned.

Send to: *McCall Poster*
FUTURE Magazine
475 Park Ave. South
New York, NY 10016

that happens.

"I've been very close to the space program since the beginning." McCall says, "in the sense that I'm an artist intrigued with the adventure, fascinated with the hardware and the true high drama of an order that we've never experienced before. For these very normal, almost childish kinds of reasons, I find myself totally immersed in painting space and future." His eyes open wide and a delighted, easy laugh escapes. "And I love it . . . I'm having fun!"

Involved with the NASA art program since its inception, McCall has spent lots of time sketching on the scene at launches and splashdowns. In quieter times he has been able to form close relationships with the people behind the space program—and the people out front, the astronauts. A perennial student of the space program, McCall reads voraciously and is always up-to-date on the technology so that he can zoom ahead with thoughtful extrapolations.

He is both the distinguished space artist and the consummate space buff—as full of wonder and excitement about outer space as the next kid. Because of his special involvement, his informed imagination and artist's eye, Bob McCall has given us some of the richest, most immediate images of the space age to date—and some of the most compelling visions of what the future might bring.

His future space scenarios most often include people along with the hardware, people ostensibly working but inevitably looking like they're having fun. Some—such as the figure in his famous "Spaceflight" (page 67)—appear to be experiencing something more intense than just enjoying the spectacular view.

"I painted that while I was still under the influence of reading about Ed White's experience, our first astronaut to walk in space. All the stories were beginning to come back from the astronauts about the euphoria they felt, free from gravity, totally free in space . . . I

Magnificent anti-gravity city hovers over the Grand Canyon. Cumulus clouds over the Arizona desert inspired this McCall vision.

Photo: James Long Assoc.

Command center on spacecraft created for Disney's *Space Probe* (top, right). (More paintings for *Space Probe* pictured with the artist on page 66.) One of McCall's sketches for *Buck Rogers* (above, middle) showing a spacecraft in refueling bay. McCall sketching NASA's space shuttle (below) on location in the California desert.

can only imagine how it must feel, but I wanted to paint something that would suggest that exhilaration. . ."

He feels quite optimistic about future populations in space, on the Moon, among the asteroids.

"It's a curious thing that man so often anticipates a new environment, a new experience, as being very formidable and frightening and so often when the truth is learned and when he arrives—instead of the sea monsters Columbus thought he might encounter—he finds the New World and it's a veritable paradise flowing with milk and honey.

"When Ed White walked in space for the first time he had such a marvelous experience that they had trouble getting him back into the spacecraft. It was a whole new freedom out there.

"I'm personally convinced that when man is really intimately familiar with the new environment of orbital space and beyond, we will find more and more that it is a very inviting environment,


CCCP

one that will reduce the restrictions on us physically when there is no longer the pull of gravity.

"Or at least, if it's necessary to have some of the gravity we're familiar with," he allows, "we will be able to control the level of gravity and its effects, and have access to weightlessness.

"Gravity is an enemy in a sense," McCall ventures, "because it really does drag us down, and as we grow older and weaker, we are pulled closer and closer and finally back into the dust from which we came. I think man's life will be prolonged when he can be free of the bounds of gravity."

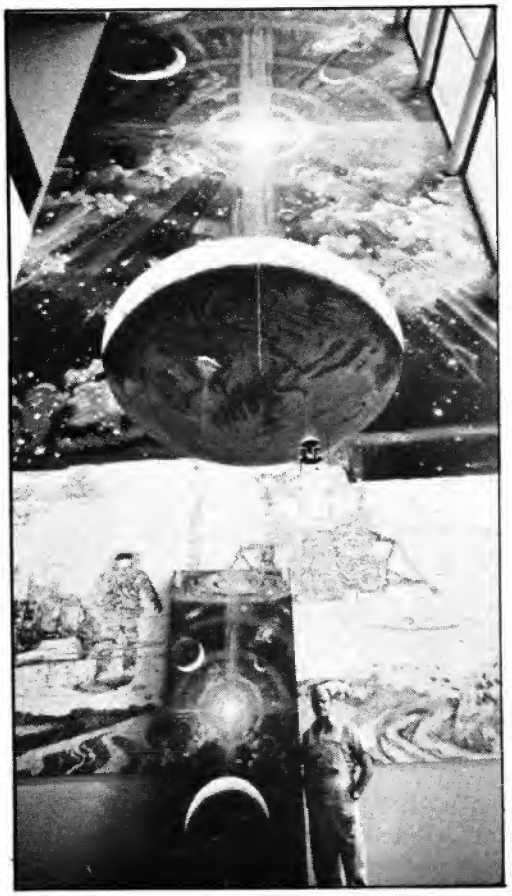
McCall's anti-gravity persuasion is also evident in his series of floating cities (page 69), a concept he places at least a couple of hundred years in the future. Where did these cities come from?

"Driving across the desert on a sunny afternoon on the way back from Tucson, I saw these marvelous flat-bottomed cumulus clouds that looked like beautiful cities in the sky. There were so majestic and impressive . . . I thought I would make a big city or architectural complex to look like the clouds and not worry about the fact that it's an impossibility and may forever remain so." A wistful expression crosses his face, then he brightens. "But on the other hand, who knows? If we can land on the Moon and do things that we never dreamed of, why not be able to control the effects of gravity?"

Why not? And if Bob McCall keeps painting such appealing scenes of weightlessness, it can only help speed the time when such things will be possible.

How did Bob McCall come to be so instrumental in designing our expectations for the future? It may have something to do with his taste for technological drama, his attraction to adventure and romance with the ideas of questing and discovering.

As a kid growing up in Ohio he liked to draw airplanes and knights in armor.



McCall working on six-story mural for Smithsonian Air and Space Museum. Facing page, McCall's poster art for upcoming SF disaster film, *Meteor*.

"I liked airplanes because they made a lot of noise and were dramatic and moved fast—all the things kids like airplanes for. The knights in armor, now that I look back, are not unlike astronauts in spacesuits, and represent some of the things to me—man adventurous, risking everything, facing new challenges . . ."

During World War II he flew as a bombardier for the Army Air Force in B-17s, B-21s and B-24s—and when there was time he painted some of the scenes he saw and experienced. After the war, as an artist working in New York, airplanes became McCall's specialty.

"When the space program started going in the 1950s, it was a natural extension of my interest in flight and flying to go from airplanes to spacecraft."

McCall wrote a letter to the art director of *Life* magazine and volunteered to set up his easel near any rocket launchings they were interested in. By 1964, McCall paintings on the cover of *Life* magazine and a portfolio of his work pulled seven million *Life* readers off the planet for a look at America's Giant Jump Into Space.

Bob McCall's life work crystallized. Through his art, he opens minds and imaginations to the wonders of space and the future. And his visions—grounded as they are in solid technology—have evolved into almost stock images of the future, influencing some of the visions which have followed. (It is not difficult, for instance, to discern McCall sources for such now-familiar hardware as the mothership in *CE3K*—his floating cities—and *Star Wars' Death Star*—his ubiquitous "habitable spheres," as he calls them, seen in his paintings for *2001*.)

We have almost come to expect the future Bob McCall paints. Indeed, his softspoken, earnest explanations of the technology underpinning the images ("that's a city under the lunar crust, in an area excavated by atomic power, with a solar energy well there in the center and the tall pillars are transport systems to the surface . . .") give the impression that the worlds McCall creates are real and alive, just waiting for the appropriate time to pop into existence.

It is that facility, his flair for injecting believable life into speculative scenarios, which launched Bob McCall into another whole area of involvement—with the film world. Since his first experience on a film—three months in London with Kubrick while he painted the posters for *2001*—McCall has been attracted to imaginative film projects. He did posters for *Tora! Tora! Tora!* (the epic-scale originals now hang in the Air and Space Museum, along with his *2001* paintings) and for *Ice Station Zebra*. His latest—the poster for *Meteor* (page 70)—is a graphic and dramatic confrontation between a destructive natural visitor from outer space and nuclear warheads launched by frantic Earthlings.

But what Bob McCall really likes to do is get in on the beginning of a movie, be involved in giving the look to a production. He collaborated with Doug Trumbull (whom he first met while working on *2001*) on a film project that never made it to the screen.

"It was called *Pyramid*," McCall says, just a little wistfully, "and it was going to be a bizarre, marvelous story

about when the Earth stops rotating and the Sun is diminishing, and so we created this city of survivors with their solar furnace collecting all the energy in the middle of this fabulous, futuristic city . . . but it never came off."

McCall recently had his first chance to get in on the ground floor of a major motion picture which will (eventually) make it to the screen. Last year while he was painting his magnum opus to the space age on the wall of the Air and Space Museum, Disney Studios called up to inquire if he would be interested in sparking some ideas for a new science-fiction film. He saw the script and as soon as the mural was complete, he set up shop at Disney for six months and did nine paintings for Disney's long-awaited cosmic epic, *Space Probe*. Since he completed his work the script has undergone a couple of rewritings and McCall has literally no idea how much his concepts will shape the film. But he is philosophical:

"The paintings are an entity. They are there, and I've achieved that."

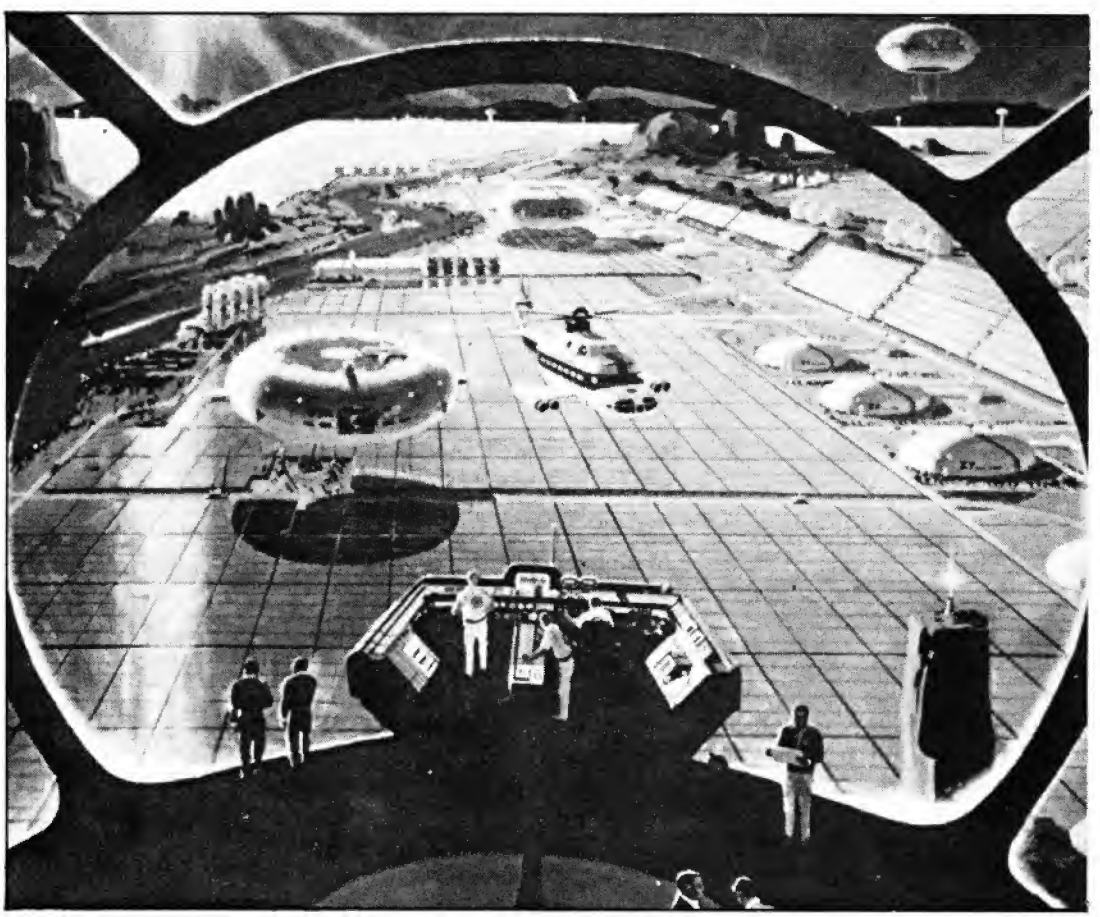
He's eager to translate his visions to film action and can't help mentioning that he's currently talking with some "very interesting people about some very, very interesting projects which, unfortunately are not quite ripe for discussion yet.

"But FUTURE will be first to know as soon as we have something solid," he assures us.

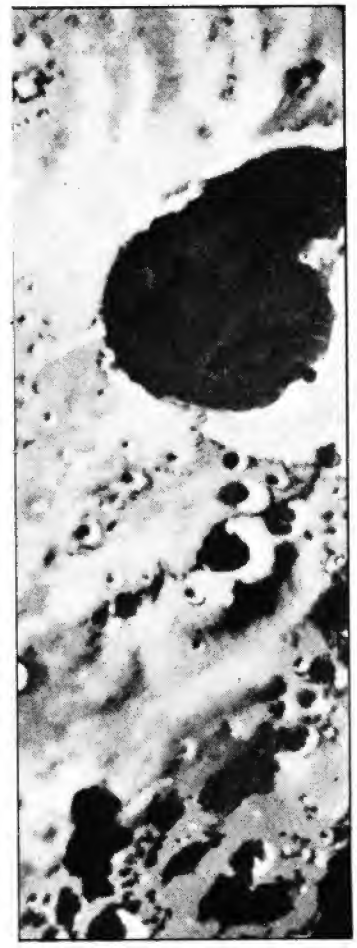
"The most exciting thing about the movie projects," Bob McCall explains, "is thinking about the things that will evolve that I haven't even imagined yet. I get very excited thinking about the things I'll come up with that I don't even know about . . . it's like giving birth!"

He pauses reflectively. "That's, in a way, the same thing that excites me about the future in space. With all the knowledge we have now and all the imagination we apply, the most exciting part is thinking about what will evolve that we haven't been *able* to imagine!"

If the future in space happens to turn out as Bob McCall envisions it—and it's easy to believe it will, at least in the near term—imagine his surprise.



McCall's concept for a solar energy institute located in Arizona (painted for *Arizona Highways* magazine). The ground is covered with photovoltaic arrays which transform sunlight into electricity. The view is from a window of a lighter-than-air doughnut-shaped craft, as seen in background, used to construct the solar energy farm.



Next-generation astronaut hovers over lunar surface. McCall uses NASA photographs of the Moon to accurately depict lunar topography. Rocket-pack is in the works at NASA.

A nuclear-powered lunar shuttle delivers cargo to underground Moonbase (just through that crater) while tethered astronauts stretch their limbs.

NOISE

(Continued from page 18)

as science fiction or as "sci fi" anyhow; and I was brought up to believe that science fiction, whatever its shortcomings in the way of character, catharsis, and grammar, was supposed to try to be intellectually coherent: to have an idea, and to follow it through. Neither of these movies would know an idea if they fell over it (which, of course, given their subject matter, they frequently do). *Star Wars* is all Action and *Close Encounters* is all Emotion, and both are basically mindless.

The emotional bias interests me somewhat more—it's a greater artistic risk to take. In *Close Encounters* sometimes the emotions do move. Children are genuinely important throughout it, and so there is a deep resonance for a moment when the aliens first appear, childlike, gracile, almost fetal forms bathed in pure light. But then Mr. Spielberg blows it with a disastrous close-up. His hand is so heavy! Nobody is allowed to do anything, even load a camera, quietly or easily; all movements are frenetic, violent, as if the characters were being pursued by giant sharks. Yet the actors are so good they establish personality and believable response against all the odds. You begin to feel with them, to go along with them . . . and then another load of hysteria gets dumped and the volume gets turned up another notch.

The end for instance. I think we're supposed to be sort of misty-eyed; but what about? I want to be clear about what I'm misty about. Is it because they didn't blow us up? Because the hero's doing what he wanted and going off in a really gorgeous supersaucer? But what happened to the other guys (and gals) in red pantsuits? They don't seem to be going into the saucer with him. And why does the heroine express her emotion by suddenly ignoring her beautiful kid and shooting a full twenty-four-shot roll of snapshots, color slides no doubt, of the hero's exodus? There she is, smiling through her tears, pressing the shutter again—and again—and again—and again—and again—Is that an adequate dramatic expression of human emotion at a peak experience? Is it even appropriate? I find it pitiful: and, since this is a movie, grotesquely self-conscious. It happened, because it's on film . . .

Well, it's real pretty. And some day they'll make a science-fiction movie. Meanwhile, I think I'll go home and see *Dersu Uzala* for the third time. Because it's a movie about a world and a time none of us will ever see; about aliens; about fear, and love; because it lets us see that the universe really is endless, and terrible, and beautiful.

The Military Presence in Space

Bova

Ben Bova is a novelist, lecturer, and editor of Analog Science Fiction-Science Fact *Magazine. His novel* Millennium *examined the political and human ramifications of placing laser-armed ABM satellites in orbit. His latest novel,* Colony, *deals with terrorism in an O'Neill type space colony.*

It was Arthur C. Clarke who coined the phrase: "The future isn't what it used to be." This is especially true in Clarke's own favorite field, space exploration, where most of the predictions made by the "experts" (including Clarke himself) have proven to be so far off the mark.

For example: Back at the end of World War II, most experts thought that space flight was a fanciful waste of time and money. Professional scientists predicted that we might reach the Moon sometime in the Twenty-First Century, but certainly not before then. Why would anyone spend the money and effort for such a foolish, meaningless stunt?

Science-fiction writers knew better, but not much better. The dean of them all, Robert A. Heinlein, saw a Moon project being pushed by American industry, not the government. In his film, "Destination Moon," he had an intrepid band of entrepreneurs dashing off to the Moon in a nuclear-powered rocket launched from the desert of the American southwest.

And no one, absolutely no one, predicted that the first landing on the Moon would be televised to billions of goggle-eyed people back on Earth!

Today, we see scientific experts and science-fiction writers happily predicting a beautiful and bountiful future for the space program, despite the apparent reluctance of the Congress and the White House to push boldly forward. Nevertheless, the "standard future" predictions for space flight envision exploration of the outer planets, and the construction of huge O'Neill-type space colonies somewhere between the Earth and Moon. The colonies will construct Solar Power Satellites which will beam plentiful energy to Earth. Orbital factories will also open up new space-based industries. There's gold in them th'ar asteroids, sonny!

Here's a scene from a typical scenario of the wonderful future of spaceflight:

You are sitting in a thickly padded contour chair inside the sleek interior of a Space Shuttle. You have just gone through the thundering vibration and pressure of liftoff from the Kennedy Spaceport at Cape Canaveral and now the Shuttle has achieved its orbit around the Earth.

As the smiling stewardess floats in the aisle and warns you to keep your seat harness buckled loosely across your chest, you begin to feel the heady excitement of zero gravity. It's like the greatest downhill ski run ever. It's free-fall, like dropping out of an airplane, floating, falling, weightlessly soaring. And all the while you're snug and comfortable in your big padded seat.

You turn to smile at the long-haired girl sitting beside you. But she is grim-faced. She unbuckles her safety harness and begins to float up out of her chair.

The stewardess, still smiling, starts to drift down the center aisle toward her as the chief steward's voice comes over the intercom, "Please, ladies and gentlemen, we must ask you to remain in your seats with your harnesses buckled until Captain . . ."

His voice chokes off.

You turn around in your chair and see several other passengers bobbing weightlessly in the aisle. Your next-seat neighbor is speaking in low hissing tones to the stewardess, who suddenly looks frightened.

A new voice comes over the intercom: "Attention! This spacecraft is now under the control of the Brooklyn Separatist Guerrillas! Everyone will stay in their seats or we will shoot you. The crew will fly this Shuttle to our secret landing base in Flatbush, where you will all be held as hostages. All power to the Sweathogs!"

You've been hijacked.

* * *

Nobody's making realistic predictions about space flight. All the forecasts are glowing accounts of how great it's going to be when we get there. These forecasts are designed to extract funding from Congress—from *you*, since you pay the tax money that Congress spends. None of these forecasts face reality.

Back in the 1940s, when the experts were "predicting" lunar flights in a century or so and the science-fiction writers were hoping that a dedicated team of far-sighted men would do it sooner just "because it is there," hardly anybody looked at the real political and economic factors involved in space flight.

Much the same situation holds true for today. All those rosey forecasts of O'Neill colonies and factories in orbit fail to examine the political and economic realities of the situation.

There will be terrorism in space. And war.

Of all the predictions I've ever made (which includes predicting the US-USSR

"space race" for the Moon) I hope that this one is the least likely to come true. But I have a strong feeling that it will come to pass. There is no reason to expect human violence and political competition to be left behind on Earth. Human beings don't suddenly become angels when they go into orbit.

More than a year ago, the members of the L-5 Society—a private organization dedicated to promoting the construction of O'Neill-type colonies in space—were shocked to read in their *L-5 News* magazine that space could become an arena for military hostilities. Not only did they react in righteous indignation against such an idea—they refused to consider it at all! They loudly protested that "that kind of thing won't happen in space." Why? Because they don't want it to happen.

But it can happen. And it will. In fact, if and when O'Neill-type colonies are built in space, they will probably manufacture military hardware, rather than Solar Power Satellites.

Here's why:

For more than a dozen years, both the US and Soviet Russia have been developing very high-power energy weapons: lasers, proton beam accelerators—real-life analogies to the "disintegrator guns" and "death rays" of old science-fiction stories.

In the corporate headquarters of Caterpillar Tractor Company, in Peoria, there is a 10 kilowatt carbon dioxide laser whose infrared beam cuts through the toughest steels used in building bulldozers at rates of up to fifty or a hundred inches per minute. That laser, built by Avco Everett Research Laboratory, takes up a large room filled with its power supply and intricate electro-optical equipment.

Large and cumbersome though it is, that laser could be launched into orbit aboard a Space Shuttle.

Lasers are now powerful enough for military weaponry. And the place they will be used first is in space, where there is no atmosphere with clouds and air masses of differing temperatures to distort the laser's beam.

Laser-armed satellites would be able to destroy ICBMs during their rockets' boost phase, when they are quite vulnerable. Will that lead us closer to peace, or closer to war?

Today we have a tenuous "balance of terror" in which both Russia and America know that they cannot use their nuclear weapons without having the other side's nuclear bombs used on them. Stalemate.

But suppose the Russians put up enough laser-armed satellites to give the Kremlin the feeling that they could stop—or at least blunt—an American nuclear counterstrike? Wouldn't that tempt the Kremlin to hit us with every nuclear-tipped missile they possess and end the Cold War in complete victory? Wouldn't that tempt them to strike *before* we could put up an equally effective laser-satellite defense network?

At the very least, it would allow the Soviets to push us around internationally, since we'd be under their guns and they'd be relatively safe. And you can reverse the situation, too: we'd push the Reds around if we had the upper hand.

Carry the scenario a bit further.

Since technology isn't the private possession of any individual nation, the chances are that *both* the US and USSR (and perhaps other nations as well) will start to place laser-armed ABM satellites in orbit. Then we get into a very interesting little undeclared war, a hundred or so miles over our heads. We'll be trying to orbit as many laser-armed satellites as fast as we can, to give ourselves foolproof coverage against missile attack. So will *they*. We'll also be trying to knock down—or at least deactivate—as many of their ABM satellites as we can. So will *they*.

It will be a deadly, silent game, played perhaps entirely by automated machinery with only an occasional human astronaut or cosmonaut involved. But if and when one side gets the upper hand in orbit, it achieves the upper hand here on Earth.

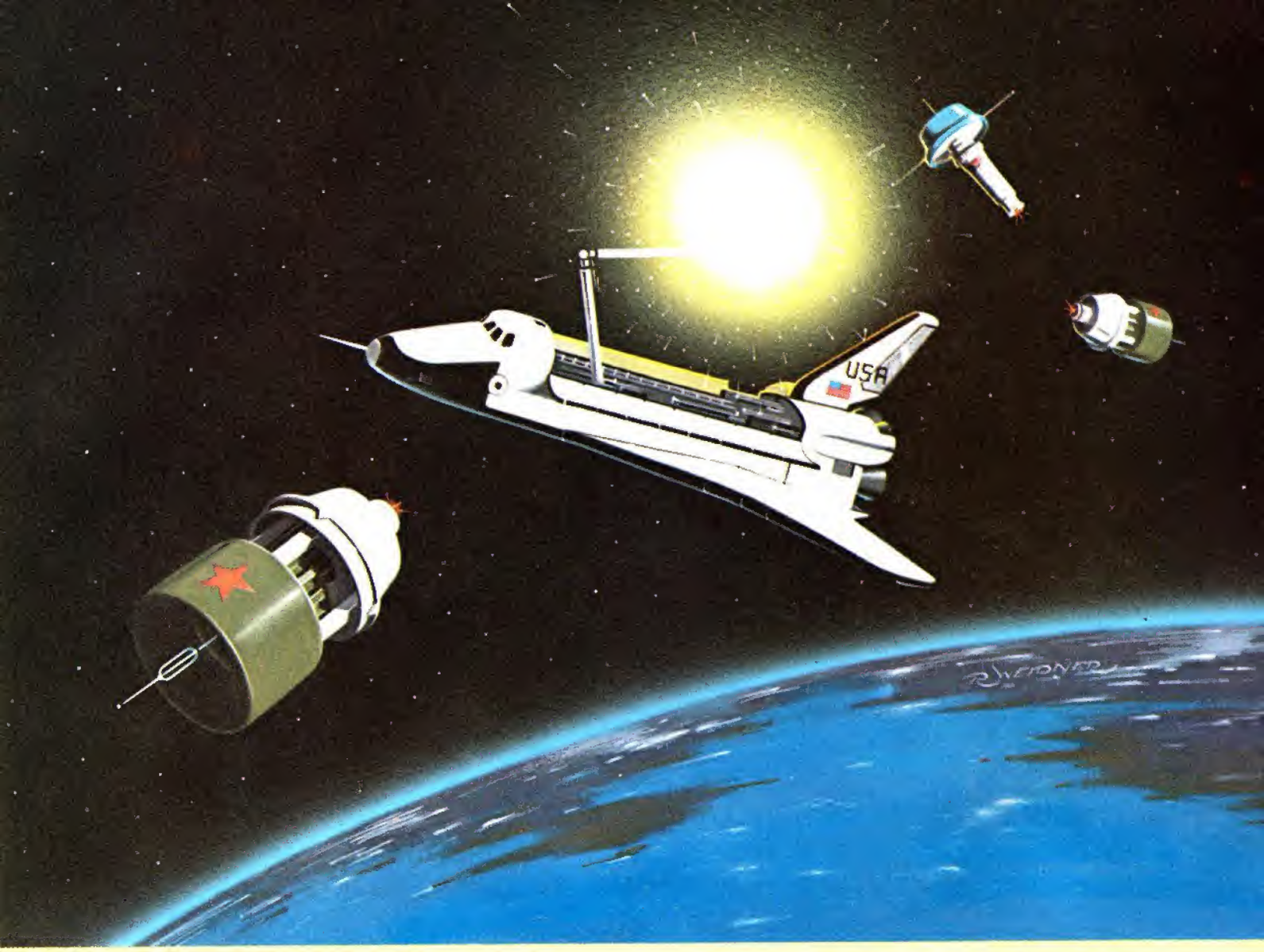
As a matter of fact, the Secretary of Defense announced early in 1978 that the Soviets have an *operational* satellite-killer system working. For the past several years, they have tested a system of orbiting a satellite that can seek, find, and destroy another satellite. That system is now operational, ready to be used on any satellite that the Russians want to knock off.

Moreover, in 1976 an American observation satellite was "blinded" during an orbit over the Soviet Union. At first, rumor had it that a powerful Russian laser, fired from the ground, had destroyed the satellite's camera. Later the Pentagon announced that a very bright forest fire in Siberia had done the damage; no laser was involved. Which immediately gave insiders the feeling that it was indeed a Russian laser!

The Soviets already have the capability to blind and/or destroy our satellites.

It is not a happy thought to consider that military operations will be taking place in space within the next few years. There is enough of the idealist in each of us to make us wish that space could be a peaceful domain, where human beings will work together in harmony. But we must be realistic. Unless strong steps are taken right now, space will become another arena for human conflict and war.

Some steps have already been taken



The chilling scenario above was done by artist Randy Weidner based on Bova's extrapolations on the presence of the military in space. Two Soviet killer-sats have attacked an American space shuttle as it prepared to service a U.S. spy satellite.

to "de-militarize" space. America and Russia have both agreed that no weapons "of mass destruction" will be placed in orbit around the Earth, and that the Moon will remain an international zone, where no nation can establish any claim of sovereignty or establish any military bases—just as Antarctica is treated today. (However, the growing realization that Antarctica is rich in natural resources is stirring some nations—including Russia—to try to bend those international agreements. Or scrap them altogether.)

Is a laser-armed satellite a "weapon of mass destruction?" Obviously not. It is a pinpoint defensive weapon whose only value is to shoot down individual rockets. Or satellites. As soon as America or Russia has the capability to orbit such weapons, they will do so, and argue about their treaty agreements afterward.

Look farther ahead. Most of the major corporations around the world are already making plans for operations in orbit. Space factories, orbital laboratories, mines on the Moon, exploration of the asteroids for their mineral resources—all these are being seriously discussed in corporate planning groups and board rooms.

Is it reasonable to put so much of our effort, our capital, our talented human resources into space without even thinking about the necessity to protect them? There isn't a single American tourist travelling anywhere in the world today who doesn't have the shadow of American political and military power protecting him or her. There isn't a single American-owned factory or business establishment that is not protected by our strength.

Will we put up orbiting laboratories, experimental factories, full-scale colonies at L-5 or elsewhere, without the means to protect them?

Imagine, for instance, a day in the not-too-distant future when the majority of our telephone links are beamed through a handful of communications satellites. Suppose a band of terrorists seized those satellites, or threatened to destroy them. The nation's social and business networks would collapse if the satellites went out. The economic damage would be catastrophic, to say nothing of the lives that would be lost.

Looking slightly farther ahead, how vulnerable would an L-5 colony be to guerrilla attack or takeover? If such a colony produced Solar Power Satellites for an energy-hungry Earth, what would be the political consequences of a terrorist seizure of that colony?

Since the earliest days of the Vanguard satellite program, back in the 1950s, the underlying theme of American space efforts has been that the space program is "peaceful." Because we don't want to see space become a military battleground, we have consistently ignored the realities of the situation.

Space is no more "peaceful" than the waters around Midway Island, or the grassy ridges around Gettysburg, or the Belgian town of Waterloo. People make wars, not geography.

There is still time to hammer out the international agreements necessary to assure that no military operations will be conducted in orbit, or on the Moon, or elsewhere in space. I doubt that those agreements will ever be made.

And even if they are, we will still have to protect our growing investment in space against terrorism and guerrilla warfare. When I take my first Shuttle ride, I want to make certain that we get to our planned destination without being hijacked!

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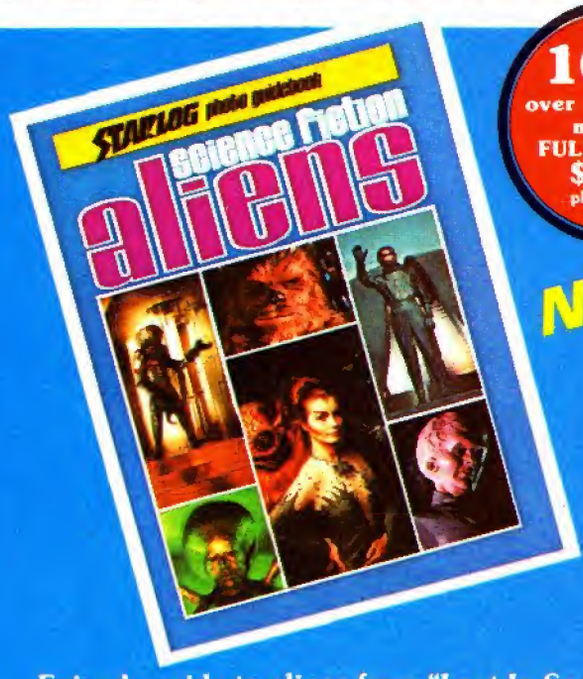

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